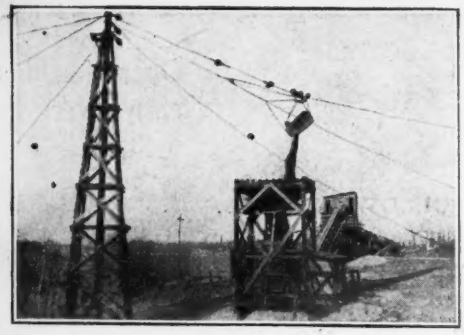
Pit and Quarry

SAND • GRAVEL • STONE

HANDLING • CRUSHING • SCREENING • WASHING



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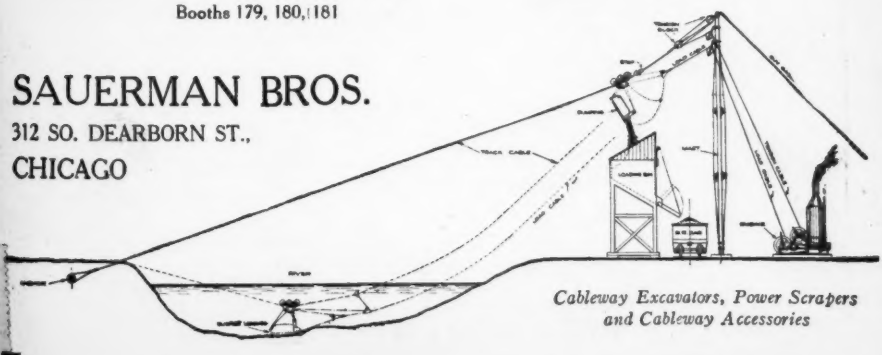

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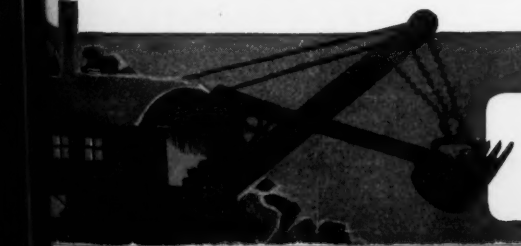
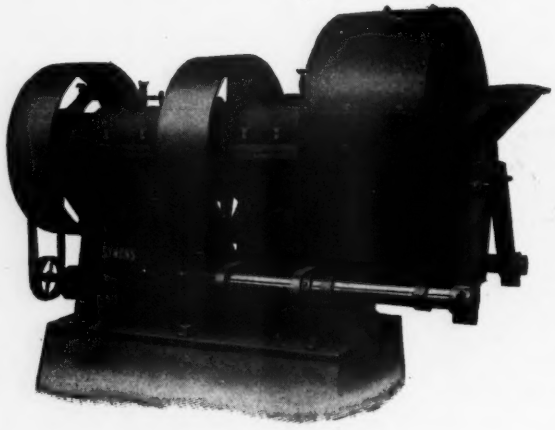


JANUARY 1917

Symons Disc Crusher



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"	36 "	"	25 to 65	"	"	"
"	48 "	"	45 to 120	"	"	"

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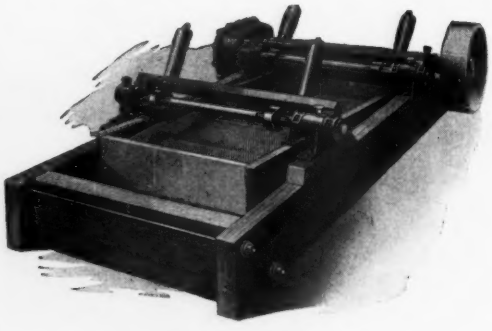

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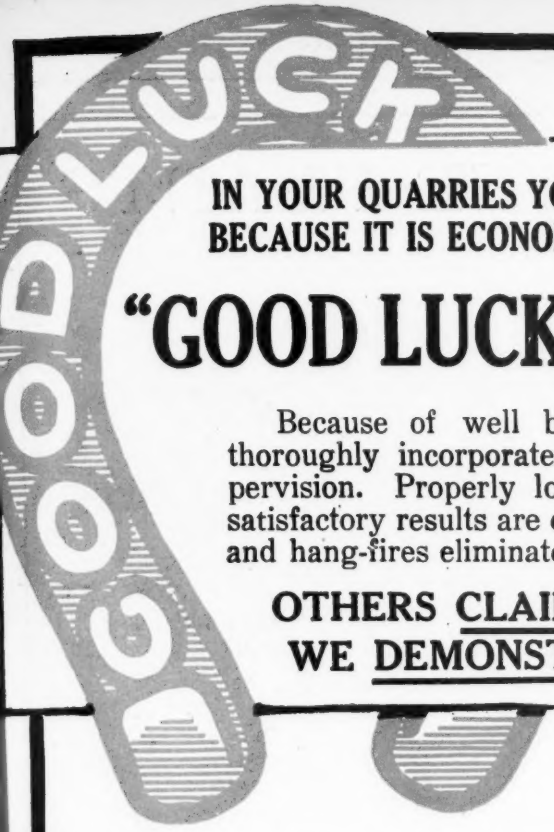

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is not all alike—nor should be. What is right for one operation is wrong for another. "GOOD LUCK" Dynamite in its various grades and strengths is prepared to meet the most exacting conditions in pits and quarries. Its reputation is high, its quality higher. The superiority of "GOOD LUCK" Dynamite is easily demonstrated and we are prepared to do it. We claim "GOOD LUCK" Dynamite is absolutely the best and we will prove it to you. Your inquiries earnestly solicited. We know they will result to our mutual advantage.

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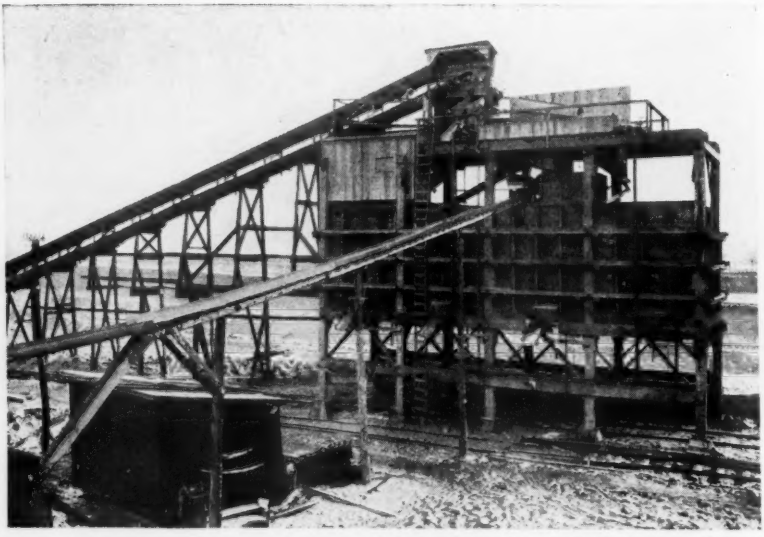

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EQUIPMENT to Pit or Quarry Operators

FIND OUT!

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Hercules L. F. Explosives are as follows:

Hercules L. F. Nitro-Glycerin Dynamite. Made in all strengths from 15 per cent. to 60 per cent.

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HERCULES POWDER CO.
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Makes a product from oversize gravel or Quarry rock from ¼ to 3" in one operation.

Capacities from 5 to 300 tons per day. Jaw openings 5x6 to 14x24 inches equipped with manganese jaws and removable bronze bearings.

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Will pump your water, wash your sand and gravel, crush your rock and stone, at less cost than you can possibly do it for by using steam or electricity

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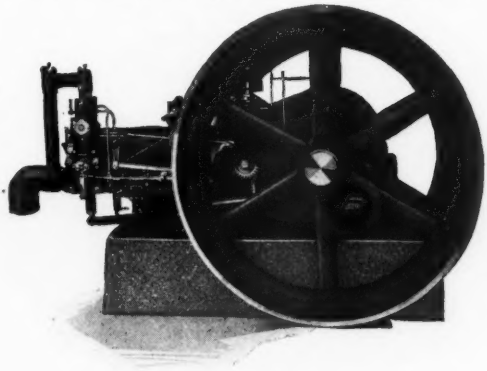

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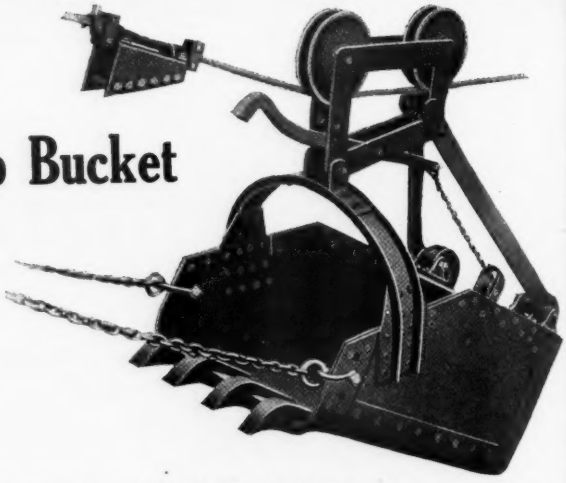

for slack cable excavation of sand and gravel, as well as miscellaneous excavation.

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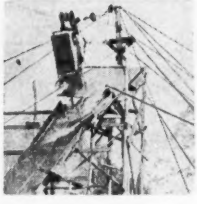

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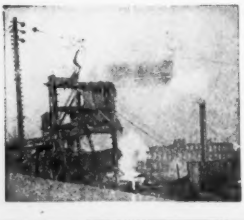

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Pit and Quarry

Vol. I **JANUARY, 1917** **No. 2**

A Bi-Monthly Journal for Producers and Marketers of Sand, Gravel and Stone.

Subscription Price $1.00 *Per Year.*

Address Pit and Quarry, 527 S. La Salle St., Chicago. Tel. Harrison 6729.

Stick to the Main Highway.

As soon as it is rumored that a piece of road is to be built in a certain section of country, each farmer all along the line begins to develop an idea that he has an ideal gravel pit and that he can make a nice little piece of money on the side by selling gravel to the county. Thereupon the county engineer is besieged with urgent requests to visit and examine these deposits.

In most cases this is simply a waste of time. Because a man happens to have a little bank of sand and gravel on his farm which he has found useful for his own miscellaneous concrete work is no reason why the county would be justified in putting in the equipment to get out this material on an extensive scale. As a matter of fact many of these deposits would soon be exhausted and would not furnish material in any adequate quantity, if an attempt were made to work them.

The specifications for materials of this kind are constantly becoming stricter, not only narrowing down the possibilities, but also making a greater investment for equipment necessary in order to get out the material in the proper shape.

Engineers are thus coming to find that they can usually stick to the established commercial sources of supply without wasting any time making local investigations.

"Be Sure You're Right," Etc.

A case in which alleged faulty sand was used in pavement work is now being fought out in the Indiana courts.

It is asserted that the sand contained a considerable amount of clay and other foreign substances which seriously weakened the pavements.

We, of course, do not attempt to say in this particular case whether the sand producer is at fault, or whether he is being made the "goat" onto which to shift the blame from where it rightly belongs. Sometimes it is one thing, and sometimes another.

It remains for the sand producer, however, to see to it that no blame can rightly be attached to him. If he has a good reputation for furnishing a material which is honest and up to specifications, this will have great weight with the jury.

A man cannot afford to take chances in a matter of this kind. If his natural instinct to be honest does not carry him far enough in the right direction, his business judgment should tell him that nothing is to be gained by delivering faulty materials to his customers. Aside from the bad reputation which it gives him, there is to be taken into consideration the fact that argument on these matters is delaying and expensive. There is no money in a contract if delivery has to be stopped before it is completed in order to have a case in court decided.

On the other hand, if the producer feels certain in his own mind that his materials are all right, and that a case of this kind is brought against him through error or something worse, he should not hesitate to go the limit to vindicate himself.

WHAT ONE ASSOCIATION IS DOING.

BY S. P. SELBY,

President, Interstate Stone Manufacturers Association, Toledo, Ohio.

I noted in your October issue your invitation to those who were connected with associations representing these industries, to write you something of the work they are doing.

I am personally a firm believer in co-operative efforts along all lines. There are so many things which men can accomplish by organized interests represented in an association which they could never hope to accomplish in any other way. Indeed, I seem to feel that in an organization a new power is actually created, rather than that the association represents the collective power of the individual members.

There are many people who remember with a thrill of pleasure the old Ohio Stone Club. This organization was composed of stone producers in the state of Ohio and served social ends principally, bringing the members together and getting them acquainted with each other, which is certainly the first step in organization work. As soon as the men in any line of business get an opportunity to look into each others' faces and grasp each other by the hand, they find that they are not such bad fellows after all and that even though they may be competitors, there are certain lines on which they can work to mutual advantage.

Out of the Ohio Stone Club has grown the Interstate Stone Manufacturers Association. While the members are still centered principally in the state of Ohio, it was thought that by broadening the name the club could be made the nucleus around which to gradually build an organization of national extent.

The work of the association has also gone beyond the social limitations implied by the word club. The fraternal, neighborly, get-together spirit is still recognized as one of the chief assets of the organization. But having become acquainted and recognizing each other as fairly decent fellows, we have felt that we could then go on and co-operate for mutual advantage along a number of lines.

I think it can be stated without touching the feelings of anyone that a certain percentage of stone producers are lacking in good business methods. They have never studied the higher mathematics of cost-keeping or cost-analysis and in a great many cases we may conclude that they did not know how much it was costing them to produce their stone.

Of course, the natural outcome of such a situation is cut-throat competition—competition based, not upon actual known cost of production and delivery, but based upon a guess at what price his competitor would quote, and go below. This is the class of competition which always puts the conservative, intelligent, business-like producer at a disadvantage.

We have proceeded on the theory, however, that no one goes into this or any other business to lose money, and that if these men who are selling stone at a price which is not paying and the depreciation of their plants, could be shown the actual facts, they could be led to change their business methods.

Acting upon this theory we started in upon a campaign of education. And I believe the results are proving the correctness of our theory. The members are gradually coming to the point of maintaining a fair price for their products—not an artificially inflated price, but a price which will give them a reasonable profit, rather than not leaving them enough to

duplicate their equipment at the end of its life, as was so often the case in the past.

These two things I have mentioned, the offering of a means of social intercourse, and the development of better business methods, are perhaps the main advantages which this association is offering to its members. We are, however, working along other lines, such as the development of markets for stone, the securing of better freight rates and freight service, etc.

We also like to co-operate with state legislatures or any non-governmental bodies which are working in the interest of the good roads movement. Road building not only furnishes us a market for our product but also gives us better means of transportation and enlarges our field of activity in a double way.

The association holds an annual meeting, which convenes at Columbus, Ohio, on the second Wednesday in January of each year. In conclusion, I take this opportunity to extend a cordial invitation to all stone producers in Ohio, or other states, to attend our conventions and participate in our activities.

Chicago Producers Getting Together

Before the close of January the sand and gravel producers of Chicago and vicinity plan to meet and pass upon tentative plans looking to the formation of an association.

The matter of organization has been in the hands of a committee of operators for the past six months.

The movement for the organization of the sand and gravel producers of northeastern Illinois was launched last July when nineteen producers accepted the invitation of the Atwood-Davis Sand & Gravel Company, of Chicago, to a dinner at the Hotel LaSalle. After listening to an address on organization by Attorney Ralph Crews, counsel for the Franklin County (Ill.) Coal Operators' Association, the following committee was selected to investigate and see if the idea could be applied to the sand and gravel business:

N. C. Fisher, of the American Sand & Gravel Company; C. H. Stebbins, of the Lake Shore Sand Company; Frank W. Renwick, of the Chicago Gravel Company, and B. H. Atwood, of the Atwood-Davis Sand Company, all of Chicago.

With the Franklin County (Ill.) Coal Operators' Association, and a similar association in Williamson county, Illinois, this committee set to work to plan for the sand and gravel men an organization that would be promotional in nature, with a freight rate bureau and a uniform cost accounting system.

Among the recommendations to be made by the committee at the coming meeting is the suggestion to call the organization the Illinois Sand and Gravel Producers' Association, which any producer who markets material in Chicago and vicinity will be invited to join. This would include the producers of southern Wisconsin.

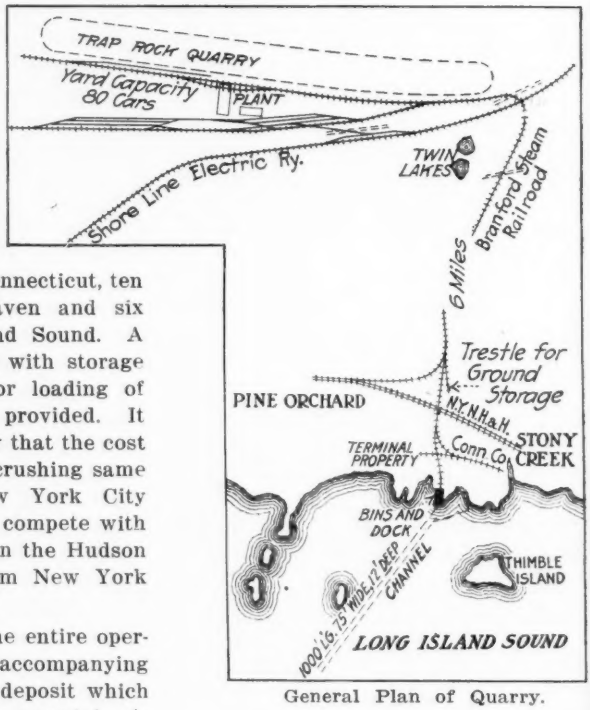
The committee is sending out copies of the tentative constitution and by-laws to all producers in the Chicago territory with a request that they suggest a date in January when it will be convenient for them to gather in Chicago and discuss the plans for organization. Among them are the following:

American Sand & Gravel Co., Chicago.
Aetna Sand & Gravel Co., Chicago.
Atwood-Davis Sand Co., Chicago.
Columbia Sand & Gravel, Chicago.
Consumers Company, Chicago.
Fox River Sand & Gravel Co., Chicago.
Great Western Sand & Gravel Co., Chicago.
Illinois Sand & Gravel Co., Millsdale, Ill.
Indiana Sand & Gravel Co., Chicago.
Janesville Sand & Gravel Co., Janesville, Wis.
Lake Shore Sand Co., Chicago.
Pyott Sand & Gravel Co., Chicago.
Ready-Ryan Company, Chicago.
Reed, A. Y., Gravel Co., Elgin, Ill.
Reinhart Brothers, Chicago.
Richardson Sand Co., Chicago.
Rockford Sand & Gravel Co., Rockford, Ill.
Waukesha Lime & Stone Co., Waukesha, Wis.
Wilcox Company, Chicago.

AN EFFICIENT ROCK CRUSHING PLANT.

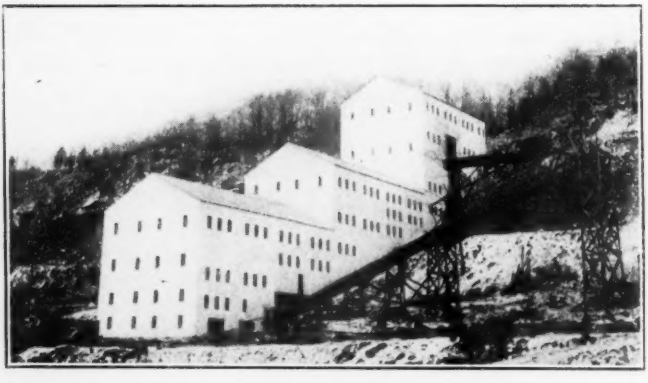
BY PRESTON K. YATES,
Consulting Engineer, New York.

The writer of this article was called upon in the spring of 1914 to open up a trap rock quarry, to design and erect a stone crushing plant with a capacity of 2,000 yards per day and place the same in operation, all within one year. The site was in Connecticut, ten miles east of New Haven and six miles from Long Island Sound. A standard gauge railroad with storage tracks and terminals for loading of barges also had to be provided. It was absolutely necessary that the cost of excavating the rock, crushing same and freighting to New York City would be low enough to compete with the trap rock quarries on the Hudson River twenty miles from New York City.



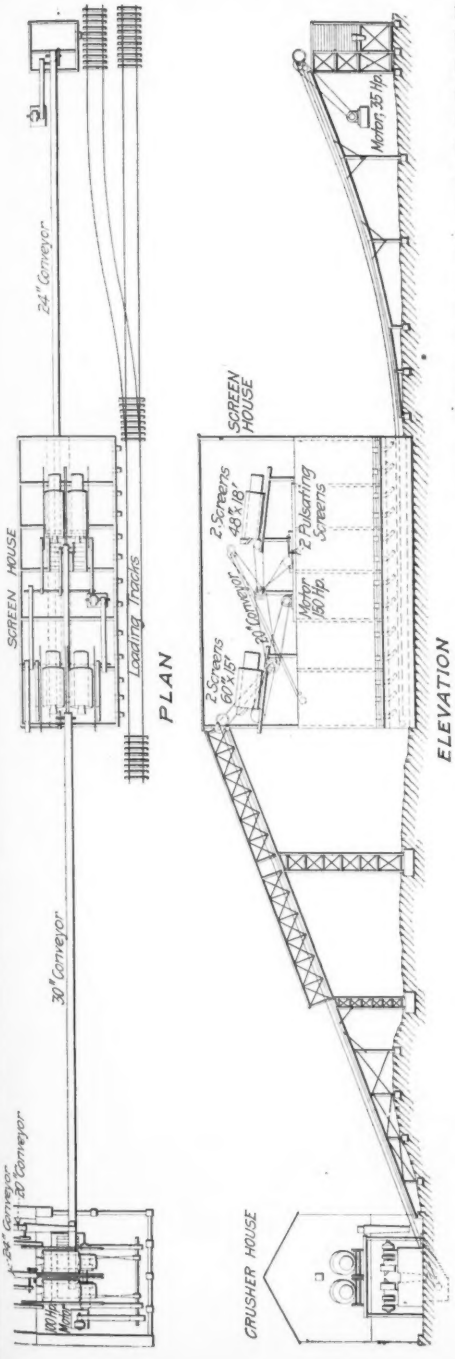
General Plan of Quarry.

The general plan of the entire operation is shown in the accompanying sketch. The trap rock deposit which forms the top of the mountain is covered with but a thin layer of soil. The face of the hill for a long distance is very abrupt. Along this steep slope a quarry face has been opened some 5,000 feet in length and 50 feet deep in height. The trap of Totoket Mountain shows the columnar formation to a remarkable extent; and when lifted by a blast, it breaks up into fragments of small sizes, leaving very few chunks so large that they require dobey shooting in order to be handled by a steam-shovel dipper.



View of Crusher House, with Conveyor to Shipping Bins and Screen House.

In working this quarry face, the present practice is to drill horizontal "snake holes" at the



quarry floor about 30 feet deep and 10 feet apart. After springing the holes, they are charged with 60 per cent dynamite. About forty holes are loaded and fired at one time, lifting an area of ledge about 400 feet long and 30 feet in depth back of the working face. All drilling is done with ordinary tripod drills and steam is used for power.

As the face has now been developed, there are two distinct quarries, so that if one is shut down to extend track or for other reasons, the other quarry may keep up the supply of rock to the crushers. The plan of operation is to take off a layer of rock 50 feet in height over the entire area. Another quarry will then be opened on a level 50 feet lower and the operation will continue as before.

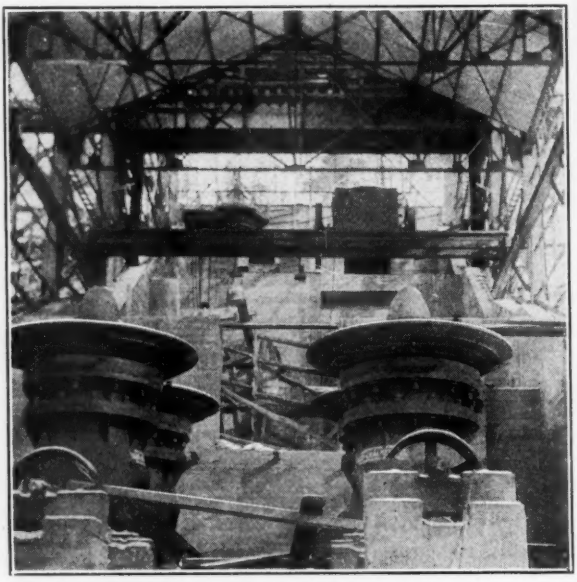
Seventy-five ton steam shovels load the blasted rock into side-dump steel cars of standard gauge of eight-ton capacity; as fast as a train of these cars is loaded it is taken to the crusher plant down a 2 per cent grade by a 45-ton locomotive. It requires two trains of ten cars each to keep each shovel in continual operation.

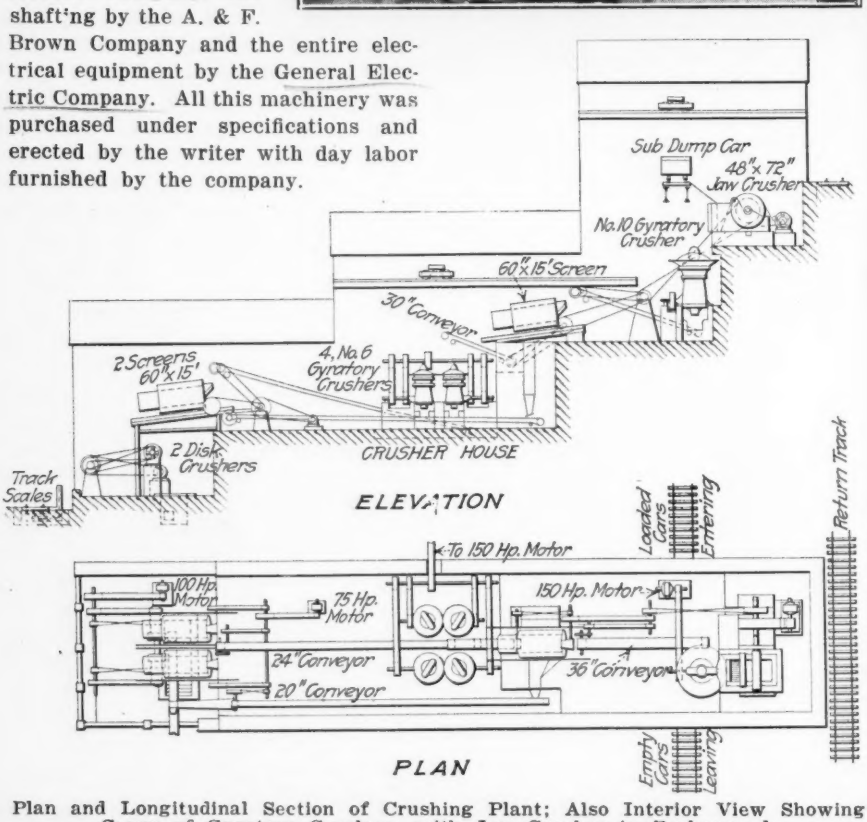
The crushing plant is built on the steep side-hill slope below the quarry level. The steep slope was a great advantage as it made possible the flow of the rock by gravity through the crushing house.

The electric current to operate the plant is transmitted at 6,600 volts over a private pole line from the power house of the New Haven Electric Company. This three-phase current is delivered to a bank of outdoor transformers which deliver the current at 5,500 volts to the main switchboard, located in a small building entirely outside of the crusher house. All of the motors are of the slip-ring type, with outside dustproof collector rings, and all motors of 100 hp. or over have three bearings.

The plant in the mill consists of one Buchanan 48x72 inch jaw crusher, one No. 10 Allis-Chalmers gyratory crush-

er, four No. 6 Allis-Chalmers gyratory crushers, two 48-inch Symons disk crushers, seven manganese screens with jackets made by the American Manganese Steel Company, and two shaking screens made by the Symons Company. The conveying machinery was furnished by the Robins Conveying Belt Company and belting for conveying and transmission by the Manhattan Rubber Company and the Boston Woven Hose & Rubber Company, the shaft'ng by the A. & F. Brown Company and the entire electrical equipment by the General Electric Company. All this machinery was purchased under specifications and erected by the writer with day labor furnished by the company.





Plan and Longitudinal Section of Crushing Plant; Also Interior View Showing Group of Gyratory Crushers, with Jaw Crusher in Background.

The general principles of the crushing operation were to take out all fine stone after passing through the gyratory crusher and to eliminate elevators by using belt conveyors instead: the stone had a continual forward movement and once passing through a crusher or screen never returned to that same crusher or screen. This greatly increased the capacity of the crushers and the mill.

The fine stone taken out passes to a belt conveyor and from that conveyor to another belt conveyor delivering stone to the sizing screens.

The sizing screens—four in number—are located in the upper part of the screen house; as the stone is separated in various sizes it falls directly in the proper bins. Six sizes of stone including dust were required. The screen house has a capacity of 4,000 cubic yards. The stone from the bins can be delivered either directly into the railroad cars run along side the bins or the bins can be emptied from the bottom upon a belt conveyor in a tunnel underneath the center of the screen house. When the run of the crusher is desired, a proper mixture can be made by opening the gates from the various bins and allowing stone to run directly upon the belt. As a general rule the stone is drawn from the chutes in the side of the bin.

The storage plant is located near the terminal and consists of a long, high trestle from which the crushed stone is dumped. In case the capacity under the trestle is exceeded a traveling revolving hoist is used to cast over the stone from underneath the trestle to an adjoining storage. The stone when required is then loaded again in cars and delivered directly to the railroad or on the barges.

A particular feature of the entire plant is that if any one crusher is out of commission the stone can be bypassed from that crusher to another crusher. The same principle applies to the screens with the exception of the first initial screen.

The crusher house is entirely of steel construction and all foundations are of concrete, so no insurance on the building or machinery is necessary.

Especial attention has been given to standardization throughout the plant and as few different sizes are used as possible. This reduces the stock of spare parts to be carried and the chance of errors in making repairs.

Care has been taken to avoid wear where the stream of stone enters and leaves the belt conveyors, the endeavor being to make stone fall on stone rather than on steel chutes. All skirt-boards are free from contact with the belts and are held by braces fastened to the stringers below the conveyors.

The screen house is located 200 feet from the crusher house. It is 100 feet long, 40 feet wide and 40 feet high, divided into six compartments. It is of timber construction made up of rough square timber placed one on the other. A flat roof protects the machinery from the weather.

It is the intention at some future time to place concrete walls on the outer side of the present screen house to make it fire-proof.

The entire design, development of quarry and erection of machinery, from the survey of the mountain to the finished product of crushed stone, was in charge of the writer and all work in construction and erection, except the erection of the steel for the crusher house, was done by day labor. The entire engineering force was located at the plant and all design and details made there. The survey was commenced May 1, 1914 and the crushing operation commenced March 15, 1915.

The writer designed and erected a plant at Tomkins Cove, N. Y., in the same manner.

One Man's Cost of Handling Sand and Gravel.

A very interesting example of the economical handling of bulk material with Blaw clam-shell buckets is afforded by a recent dock installation at Buffalo for the Niagara Sand Corporation.

A wide gauge traveling derrick of the steam Whirley type was equipped with a 2¼-yard wide-opening scraper, type S, Blaw clam-shell bucket, as shown in accompanying photograph. This equipment handles sand and gravel which is previously pumped into the steam barge Pennsylvania,

which has a rated capacity of 600 yards.

Careful cost records, which have been kept, show that the average barge load is 620 yards and the unloading time 4 hours and 10 minutes, or a gain in unloading time of 1 hour and 40 minutes over best previous unloading time.

The analysis of the costs of this operation are based on original cost of derrick, $10,000. Average amount of material handled per 10-hour day, 1,500 yards, and 250 days per year, 375,000 yards.

SUMMARY.

	Per yd.
Depreciation @ 2% ($200.00)	.00053
Interest @ 6% ($600.00)	.00160
Labor	.00866
Maintenance	.00146
Cost of fuel, oil, etc.	.00510
Per yd.	.01735

The clam shell which accomplishes these results is the Blaw bucket, manufactured by the Blaw Steel Construction Company, Pittsburgh, Pa.

Will Now Build Fireproof

The immense crusher and screen buildings, comprising the greater part of the plant of the Brownell Improvement Co., at Thornton, Ill., the largest stone crushing plant in the United States, were destroyed by fire, December 13.

The buildings were of frame construction and defied the efforts of the limited fire fighting facilities to save them. All of the screening machinery and seventeen crushers were lost. But one crusher, which was isolated from the other buildings, was saved.

The flames were checked as they reached the big $40,000 pan elevator, and that, as well as the $50,000 boiler plant recently constructed, was saved. The output of the Brownell plant last year was 1,000,000 tons of crushed stone.

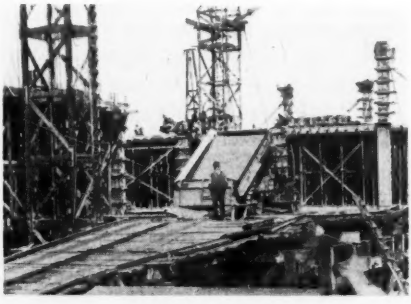
As a result of the fire the company will eliminate all frame construction from the plant and it will be entirely rebuilt of reinforced concrete, thus reducing the fire hazard to a minimum. The job will call for some speedy work as the company expects to have the new plant ready for operation in April.

Saving Delivery Time.

Many building contracts are figured on a time basis and the speed and increased efficiency with which cement, sand, slag, gravel and crushed stone may be handled by the use of motor trucks has saved large sums for the contractors.

Very often on big jobs, special devices for loading and unloading have been constructed to facilitate the operation of the trucks and a striking example of this is the use of a fleet of White power dumping trucks owned by the Cleveland Builders' Supply Company on the construction of the new $500,000 building for the Richmond Brothers Company, Cleveland.

The structural work of this building is largely concrete and many tons

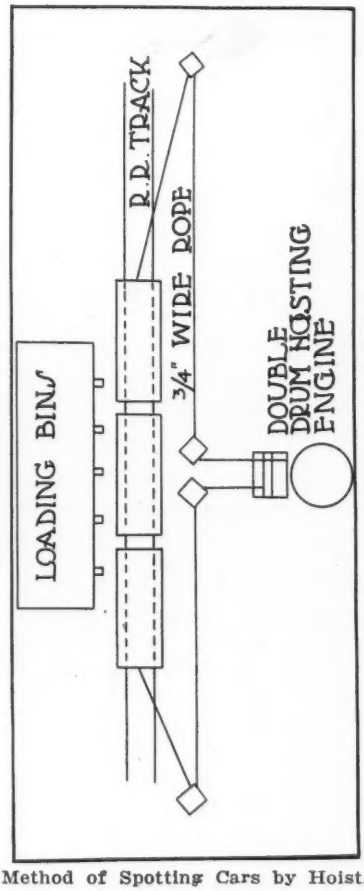


of sand, cement and gravel are mixed daily. In order to do this work as speedily as possible, the contractors have built a platform of heavy wooden beams on a level with the second story of the structure. Leading up to this platform there are two inclines built of heavy planks and with a grade of above 10 per cent. The White trucks with their 5-ton loads are driven up the incline on one side of the platform. The loads are dumped through an aperture in the platform and the trucks driven across the platform and down the incline on the other side.

In this way the trucks are kept running continuously and no time is lost in backing and maneuvering around to find the most advantageous place for dumping. Contractors have highly praised the platform device and say it saved much time and money.

Cars Spotted by Hoist.

Where the capacity of a plant is 20 cars or more per day, it often pays to install a small double-drum hoisting engine to expedite the "spotting" of



Method of Spotting Cars by Hoist.

the cars for loading at the bins. With a level track alongside the bins, a cut of two to four cars can be handled, the operator having complete control of the cut in either direction.

FAILURE AND SUCCESS IN SAND AND GRAVEL PLANTS.

BY MINER RAYMOND.

Not long ago the Saturday Evening Post published a series of fascinating and instructive articles on the development of metal mining in the Western States, tracing its growth from the individual efforts of the optimistic prospector to a specialized and systematized business in which waste is being reduced to an irreducible minimum. In these interesting articles, the production of gold, silver, and copper was dealt with as our "most human industry"; and the epithet "human" is well applied, for there are few of us to whom the one word "mining" does not flash upon the screens of our minds a cinematic series of wide landscapes, boom towns, bearded miners, daring desperadoes, smooth promoters, and all the other incarnations of human nature in the primitive that the West of a generation ago has given us.

In this year of grace 1916, there is another infant industry undergoing the same growth, and just as human in its characteristics as mining, although its romantic side is not so vivid for the simple reason that it was born among and is dependent on the more advanced manifestations of our twentieth century civilization. The development of the production of sand and gravel for concrete work, roofing and road construction has progressed in less than a generation from the laborious shovelling of pay-dirt over small inclined screens, paralleling the pan of the prospector, to the specialized plant with its revolving screens, elevators, conveyors, and steam shovels,—the first cousin of the huge smelter now standing at the mouth of the mine.

Just as in mining, the story of gravel and sand is one of individual successes and failures, the late-comer profiting by the experiences of the old-timer. Honest men and scamps, men with money and men without, expert mechanics and men to whom all machinery is a mystery,—all kinds and conditions have been drawn into the industry by visions of profit, and it is only by the stories of individuals that the causes of success or failure can be formulated into rules.

Let us therefore look into a few individual cases, confining our statements to actual occurrences, but disguising names and places for obvious reasons. As long as we stick to facts, names and places do not matter.

George G. had spent the best years of his life in farming and by hard work and steady labor, assisted by a small inheritance, had accumulated enough of a bank balance to move to town and settle down, leaving the farm in the hands of a tenant and hoping that the tenant would give him somewhere near his proper share of the products of the place. One morning he received a letter from his brother-in-law in Evansville, in substance as follows:

Dear George:

I have taken an option on as good a sand and gravel bed as I ever saw. As you know, I have never been in that business, but my fourteen years' experience as a concrete contractor has given me a right to think that I know something about what it ought to look like and what it is used for.

The bank has an old gravity screening plant on it but the owner is an old man who hasn't the inclination or money to bring it up to date. The bed has hardly been touched as the old man has done nothing but fool along with it for years.

If you will put up the money we can build a plant and make a killing as there is all kinds of work on deck here now and with all the flood damage and a building boom on.

Letters passed back and forth and finally George took the train, turned the option into a royalty arrangement, and with his contractor-partner-relative proceeded with the purchase of a

modern screening and washing plant, a new steam shovel, cars, track and all the rest. By midsummer the new plant was up and running and every invoice for lumber, labor and machinery had been discounted to the dot.

It had cost a pile more than either George or his partner had anticipated, and though the bank balance was rather thin they prided themselves that the new concern had started shipping without a debt against its fair name.

"Now then," thought George as the first loaded cars went down the track, "Here's where I begin to cash in."

Somehow or other the cashing-in process didn't seem to get a fair start. It kept on being a cashing-out affair with but few reliefs. George began to think that his dream was not as rosy as it had seemed. Pay-rolls came around with startling regularity, maintenance and repair bills mounted up to surprising totals and George found that the royalty arrangement was mighty nice for the land owner but not so nice for him when there was no money with which to pay royalties. Collections were awfully slow, mainly because many of George's customers were contractors who depended on returns from their jobs to pay for their materials.

The story of George is soon told. Failure to provide a substantial working capital brought him to forced sale which cleared the George Company of indebtedness and everything else as well, but sent George back home to face the future on a heavily mortgaged farm. His successors bought a nice plant for a song, hired the brother-in-law to run it, put plenty of money back of it, and are today turning out a good product at a fair profit.

Our next story is that of Bill and Jake, brothers and partners in a lumber concern, with their main yard on the outskirts of a Great Lakes port where rail and water transportation are excellent. Their business methods had made them fairly wealthy, and success had given them a self-reliance which in men of their type precluded the extension of their organization beyond the scope of their own direct efforts. Some of their friends had built and operated sand and gravel plants to good advantage, and with plenty of capital in their possession Brother Bill proposed to Brother Jake that they, too, get into the new game. They had made money in lumber, and had money to invest,—why shouldn't they?

Investigation of a few plants and a superficial study of markets and selling methods, confirmed their suspicions that here was a chance to increase their incomes, so salesmen were sent for and right there their troubles began. The salesmen knew the machinery that they were selling, and as all real salesmen do, knew also a good bit about production problems and methods. Bill and Jake, as successful business men thought that they too knew something. The salesmen were *selling*, they were *buying*, and so Jake remarked to Bill:

"No smart-alecky salesmen is going to make *us* buy anything we don't want. We were making money when these boys were asking papa for a penny."

Furthermore when the machinery men asked detail questions as to just what the machinery was expected to do, Bill and Jake each had a different idea and the salesmen had to pick a doubtful answer out of a stubborn brotherly argument in which neither side had the solid footing of experience. The plant was finally built and the machinery fulfilled manufacturers' promises (conservative in this case) to the letter but somehow the product did not seem to move very fast. Separations were not always within specifications, which were then and are now growing stricter as the industry progresses. Bill and Jake lost money and sold the plant. Their suc-

cessor called back the machinery men, in whom he had confidence and whose suggestions received serious consideration. As a result Bill and Jake saw their old plant re-arranged and rebuilt into a paying proposition without a great lot of trouble or expense.

"If that fellow can do the trick, we can too," said they, and once more they went at it in the same way on a new tract of pay-dirt. Again the profits of their lumber business had to bolster up a losing venture and again they sold their plant. At last they raised their right hands and solemnly chanted: "Never again, there is nothing in it!" —and they believe it, too. Are they not successful business men—in lumber?

Our last tale is of John A. who sold his grocery, and in partnership with a banker, Jim B., and a civil engineer Joe C., bought a site and built a plant. John and Jim put up the money, and Joe took care of the survey and the placing of the contract for the plant with a reliable engineering and manufacturing concern who makes a specialty of sand and gravel machinery. The property was at some distance from the city where the three partners lived and John was the only one free to move himself and his household to the village where construction of the new plant was rapidly progressing. In good time, the manufacturer's millwrights turned over an acceptable job and all three partners expressed themselves as satisfied with the test run. Jim and Joe returned to their banking and engineering activities leaving John in charge of their investment. The plant was not a large one and country-side labor was employed. Soon little things began to go wrong with the equipment. A few breakdowns of a minor nature occurred and presently the ex-grocer, who had no mechanical experience or intuition to fall back on, wired the manufacturer for help. The erection foreman came back, wired for a few repair parts—there were none on hand—and overhauled the entire job. Within a month he was called back and again a few weeks after that. Meantime the enforced shut-downs had proven costly, and one bright morning John received a bill for repair parts plus the foreman's time and expenses on all three trips. Coincidently there came a smash-up that put the supply elevator out of business. What John said to his partners about the manufacturer and his product is not printable, and new buckets and chain were ordered elsewhere.

The first manufacturer now urged payment of his invoices for time and materials and, receiving a very disagreeable letter in reply, threatened to place the account in the hands of attorneys for collection. With a suit in prospect, an idle plant and nothing much on the credit side of the books, Jim and Joe got their heads together and asked the manufacturer to send a representative to see what could be done. The salesman who sold the original equipment came and proved to the three partners that he knew not only his own game but a good deal of theirs as well. With a tact that precluded offense, he showed them that their trouble was their own fault. Each of the break-downs was chargeable to some fundamental neglect or to some make-shift correction of a previous break. He showed the necessity of having a first-class mechanic available at all times and a stock of repairs on hand to replace parts liable to breakage or wear.

As a result, the ex-grocer gracefully stepped aside and for more than two years thereafter, Jim, a civil engineer, but a good mechanic as well, was in charge and kept the original plant running in a way that warranted a subsequent enlargement of their operations. Today the three partners have two profit bringing enterprises where they started with one and that a losing venture.

Here, then, we have three failures that have been converted into successes. The first failed because of lack of working capital, the second because of ignorance of the peculiarities of the industry, and the third because of the mechanical inefficiency of the operator. In each the tide was turned by men who appreciated the necessity of the three fundamentals without *all* of which no sand and gravel plant can be sure of success. These three are a good working capital, a thorough knowledge of the business and its history, and a mastery of the tools of the trade. Imagine a banker without money, a carpenter designing a submarine, and a blacksmith repairing a watch,—and yet it is the stories of just such misfits that bring a good industry into the group of doubtful investments, and give it a "wild-cat" reputation. It is the failures that are featured, while the sturdy companies who own from three to eight plants and pay regular dividends on hundreds of thousands of invested capital are too often overlooked. What the public hears about is the story of the skeleton in the closet, while present generation asks in vain for judgment on present worth.

The Tennessee railroad commission has issued an order suspending the rates on carload shipments of sand and gravel from points on the Nashville, Chattanooga & St. Louis railway to Nashville and other points in the state. These new rates were to become effective Monday, November 13, and were to supplant the old rates. The commission orders that the railroad take no action pending the hearing and investigation by the commission.

A new mill is now under construction by the Michigan Quartz Silica Company to replace the old one recently destroyed by fire. At the time of the fire this company had been turning out an exceptionally high grade of silica and the plant was operating at full capacity. Mr. Edward Copps is general manager of the company.

Stone Company Has Central Machine Shop.

One of the means towards efficiency and economy in the production of stone effected by the France Stone Company of Toledo, Ohio, is the maintenance of a central machine shop, where repairs, and in some cases complete parts, are made, and where parts for all types of machines used by the company are kept in stock.

This company has twenty-one plants in operation and uses fifty-five Porter and Vulcan locomotives, forty Marion steam shovels, at least one Brownhoist locomotive crane at each plant, and other equipment in proportion.

To take care of the machine work required by such a large amount of equipment, the shops have been established at North Baltimore, Ohio, employing in all about seventy-five men. In addition to the repair shops, there is a boiler shop where all boilers used by the company are manufactured, also an extensive warehouse, etc.

Of course, parts which are liable to break frequently are kept on hand at each plant, for emergency. But it is the business of the central shop to keep a sufficient supply on hand in

Many Parts Kept in Stock.

advance, so that they can be hurried out to the plants when desired.

There is a foundry located at North Baltimore so that castings are secured right in the same town. The machine shop is equipped with the most modern machinery, including equipment for electric welding.

Meet Us at the Show.

A large number of sand and stone producers will be attending the Chicago Cement Show in February.

There will also be a number of exhibitors at the Show who are selling equipment for plants of this kind. On this account Pit and Quarry has felt that it could serve both of these classes by taking some space at the show and having a representative on hand to talk to those who are interested.

One of the enthusiastic members of our staff will be there to meet you. This might mean almost anyone in our organization, for every one connected with the publication is enthusiastic over the reception which has been accorded it, and the possibilities for development which the future seems to promise.

Look us up when you come to the show and let us get acquainted.

We will be in Booth No. 283. That will be up in the balcony—a nice little place to have a heart-to-heart talk.

Very likely you can suggest to us some new features for Pit and Quarry which we have not yet thought about. Come and see us anyway.

Your Machinery Is Valuable.

Many plants are shut down for the winter.

Some men will see to it that their plants are well taken care of, and some will not.

There ought to be no question about the care given machinery which is not in operation; but in this, just as in everything else, some men will exercise care and wise foresight, while others will let their machinery take care of itself, which means that it will be attacked by rust and other disintegrating elements, greatly shortening its life.

Machinery should be properly protected and covered with oil or some other preservative. Wire rope especially should be well lubricated.

The man who takes the best care of his machinery is usually the one who makes the most profit.

Watch This Do the Work!

A plant of unusual interest is that of John B. Rose Sand & Gravel Company, Marlboro, N. Y. This town is on the west bank of the Hudson, sixteen miles above Newburgh, and the story of the plant is told in a recent issue of The Excavating Engineer of Milwaukee.

For several years the Rose Company has been operating this bank and each year experiencing a steadily increasing demand for their product of sand and gravel. The washing and screening plant has been enlarged several times until it has reached its present capacity of about 3,000 cubic yards daily.

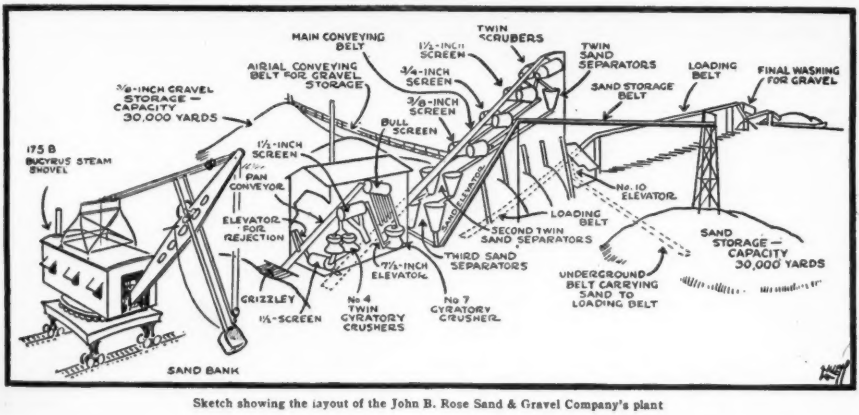
With the addition of increased screening and crushing equipment, the problem of getting the material from the bank and carrying it to the plant became an acute one. A number of devices were tried in the quarry, resulting finally in the adoption about a year ago, of a Bucyrus 175-B revolving shovel.

This machine, equipped with a 3½-yard dipper, is of the full revolving type, mounted on four four-wheeled equalizing trucks. Its main or hoisting engines are 12-inch bore with a stroke of 15 inches, which gives a bale pull of 60,000 pounds. The boom length, which is 75 feet, and the dipper handle of 48 feet, give the machine a digging radius of about 90 feet, which allows it to take a 60-foot depth cut, the front end of the machine being far enough from the bank to allow for the sliding of the overhanging gravel without fear of injury.

The dumping height is 52 feet when the dipper door is open and the dumping radius is 85 feet.

The gravel is dumped in a large hopper through grizzlies with open-

General view of the John B. Rose Sand & Gravel Company's plant on the Hudson River near Marlboro, New York.



Sketch showing the layout of the John B. Rose Sand & Gravel Company's plant

ings large enough to admit only stones that will go into the crusher. The shovel in its present operation is loading, swinging and dumping on an average of once in 26 seconds.

The Coon River Sand Co. of Des Moines, Iowa, producers of washed and screened sand and gravel and dealers in cement and crushed stone are just now incorporating with a capital of $50,000. This company is the oldest concern in this line of business in Des Moines, and is at present constructing a new plant which will have a capacity of better than 50 cars per day turning out ten different grades of sand and gravel, with a storage capacity of upwards of 40 cars of each different grade, and is prepared to load promptly any grade of material required at any time of the year winter or summer. The incorporators of the company are G. C. Hubbell, R. Snoddy and Donald Marshall.

The charter has been filed for the New Jersey Gravel Co., Atlantic City, N. J. This company will manufacture and deal in brick, stone, cement, etc. The company has a capital of $125,000. The incorporators are George S. Bennett, Richard E. Wheeler, Edgar D. Deher of Irvington.

"Sharp" Sand Again.

Mr. Editor: In the October number of Pit and Quarry Mr. Ernest McCullough asks, "Why Specify Sharp Sand?"

Because sharp stand is hard sand. The fact that it is sharp is evidence that it is hard. Round sand is soft sand. The fact that it is round is evidence that it is soft.

All sands, during the ages past, have, on an average, been subjected to about the same amount of abrasion. Sharp sands, on account of their hardness, have withstood this abrasion and are still sharp. Round sands, being soft, the sharp points and edges have worn off. Sharp sand being hard, wears longer than round soft sand when used in the construction of roadways, pavements and sidewalks—at least twice as long.

The grains of sharp sand have flat sides and sharp angles; they fit flatly against each other, and assist the cement in supporting weight, the angular grains themselves supporting part of the weight. When round sand is used, all the weight comes on the cement.

For example: Make a conical pile of round grapeshot, and a similar size and shape pile of broken flint rock. Step on the pile of round grape shot, and it flies in pieces in every direction; but step on the pile of angular rock, and it supports your weight. Just so with the round sand and the sharp sand. Add cement to these; and, in the case of the round sand, all the weight comes on the cement, but in the case of the sharp sand the flat and angular construction of the grains assist the cement in supporting the weight. Concrete made with a given proportion of cement and sharp sand will support 60 per cent more weight than concrete made with the same proportion of cement and round sand.

Another reason why sharp sand is specified is, the flat sides and angular sharp points and edges of sharp sand fit more closely together than round sand; there are less voids in the sharp sand, and it requires less cement to fill the voids and make a solid stone than when round sand is used. Fifteen to 25 per cent less cement can be used if the sand is sharp than if sand is round, and obtain same strength concrete.

R. L. MARTIN,
Ocala, Florida.

Power Scraper Catalog.

The latest piece of literature to be sent out by Sauerman Brothers, Chicago, is a 56-page catalog on the Souerman power scraper.

This company has specialized for many years in the economic handling of material, especially by means of cableway engineering. They are therefore in a position not only to offer equipment to the public, but also expert advice, based on their experience in the solution of various problems in the handling of material. The firm maintains an engineering department which is in a position to cooperate with its customers in order to secure for each particular installation the equipment which will be the most economical, both in first cost and in operating expense.

This new catalog of the power scraper is fully illustrated, not only showing in detail the various parts of the installation, but also giving drawings and photographic reproductions, showing methods of handling materials by this device. It will be sent free to anyone who is interested in handling materials, by application to Sauerman Brothers, Monadnock Block, Chicago.

The Lindahl stone quarry in Rudolph, Wis., which was sold about two years ago by Walter L. Wood to the Wisconsin Sand Stone Company, has been reopened and workmen have already commenced on a large paving block contract. It is understood that this quarry will be operated with a large force all winter to fill this contract.

Daily Invoice.

There are some concerns which find it expedient to render a daily invoice to their customers on all materials delivered, in addition to the duplicate delivery slip which is left with the customer by the driver.

Any errors which may occur can thus be checked up at once, while if the concern waits until the end of the month, or the end of the job, to render an invoice, discrepancies are likely to occur which will take some time to adjust.

One such concern is the Interstate Material Company of Davenport, Iowa, copy of whose daily invoice is shown herewith. This is made out in duplicate, the sheet which is here shown being retained in the files of the office. The duplicate which is sent to the customer has the stub perforated for detaching, as the data on cost is, of course, not sent out to him. The stub is also perforated horizontally between the different sets of blanks for material cost, so that each kind of material can be itemized separately, and the stubs torn apart so that those on each kind of material for each day can be assembled and tabulated.

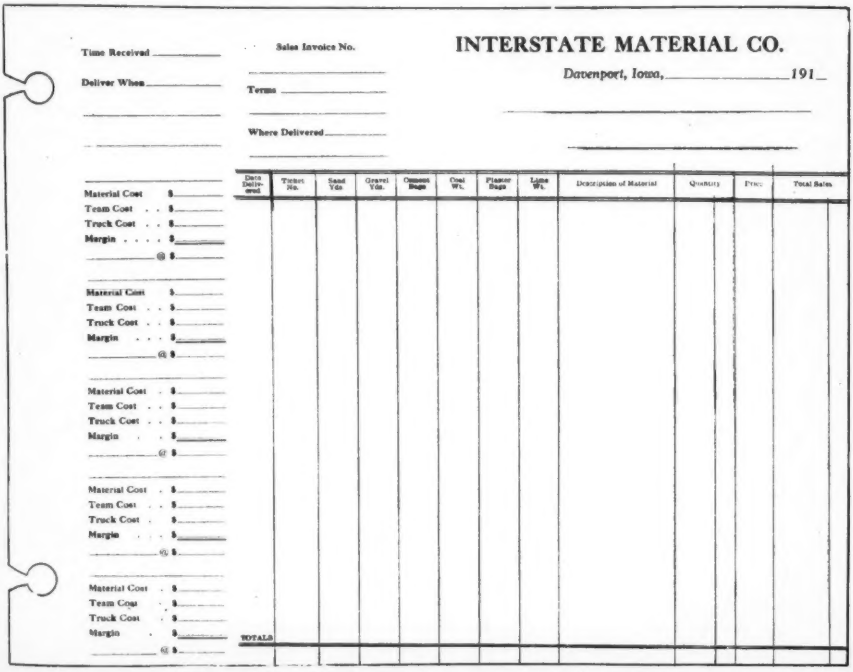
Disappointed!

In opening up a stone quarry along the Mississippi River a short time ago, the operators came upon what appeared to be a lot of silver coins. They were the size of quarters and looked like "easy money."

The men were doomed to disappointment, however, for upon closer examination the coins proved to be the remnants of the stock-in-trade of a gang of counterfeiters which operated in that locality a number of years ago.

If this incident means anything at all it probably indicates that a man is not likely to attain sudden wealth in the quarry business any more than in any other pursuit, but that the reward comes to those who work a good deposit persistently and economically.

Thus endeth the first lesson.



Time Received _____
Deliver When _____
Material Cost $_____
Team Cost $_____
Truck Cost $_____
Margin $_____
_____ @ $_____
Material Cost $_____
Team Cost $_____
Truck Cost $_____
Margin $_____
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Truck Cost $_____
Margin $_____
_____ @ $_____

Sales Invoice No. _____
Terms _____
Where Delivered _____

INTERSTATE MATERIAL CO.

Davenport, Iowa, _____ 191_

Date Delivered	Ticket No.	Sand Yds.	Gravel Yds.	Cement Bags	Coal Wt.	Plaster Bags	Lime Wt.	Description of Material	Quantity	Price	Total Sales
TOTALS											

Form of Invoice Used by a Davenport Producer.

Plant of Rockford Sand and Gravel Company.

New Rockford Plant.

The plant of the Rockford Sand and Gravel Company at Rockford, Ill., which was built last summer, is one of the best equipped plants in the country and demonstrates the rapid progress which is being made in machinery and plant construction for the production of washed sand and gravel.

The bins are arranged to hold four grades of material, two sizes of gravel and two of sand. These bins are of mill construction and are mounted on a heavy concrete base, which extends about 12 feet above the ground level. A section of this foundation supports each partition of the bins.

The material is excavated and conveyed to a hopper at the top of the plant by means of a Dull cableway excavator of 1½ yards capacity, operated by a Lidgerwood 100-horsepower two-speed electric hoist.

From the hopper the material is fed directly into a row of three screens, which are of the well known Dull inclined conical type. The first screen takes out the oversize, which is spouted back into a 36-inch Symons disc crusher. The crushed material is then carried up into the hopper by means of a No. 4 elevator, and hence into the screens. The second and third screens take out the two required sizes of gravel, while the sand and water are flumed on to two Dull conical sand separating tanks. As two sizes of sand are desired, a flat screen is placed in the flume, so that the fine sand with a portion of the water is discharged into the first separator while the coarse sand with a portion of the water goes into the second tank. The separators take out the sand, and the dirty water is flumed away.

This plant is electrically driven and has a capacity of 25 to 30 cars per day.

The plant was designed and the entire equipment furnished by the Raymond W. Dull Company, of Chicago. This company has secured some excellent motion pictures of this installation.

Steam Shovel Chain.

The quality of service given by a steam shovel depends in no small measure upon the hoisting chain. To keep pace with the more and more exacting demand made on steam shovels it has been necessary to im-

prove the wearing qualities of the chain.

The old reliable firm of chain manufacturers, the S. G. Taylor Chain Company, Chicago, Ill., which has just completed 43 years of successful business, has long been known as the maker of the Taylor-Made dredge quality chain.

Keeping in line with the new requirements, they started some years ago to manufacture the Taylor Mesaba steam shovel chain, which is strictly hand forged from a carefully selected and re-rolled muck bar iron, of the greatest possible uniformity. This grade of chain has met with far greater success than its manufacturers ever anticipated, and is now in use in the iron mines of Cuba and Minnesota, the copper mines of Utah and Nevada, on railroad work in all parts of the North American continent, and on the Panama Canal.

While primarily designed for excessively hard service, it has been found to last so much longer in work of every character that the majority of the railroad contractors who formerly used the dredge quality are finding it the most economical and satisfactory for every kind of digging.

Those who are having chain troubles will find it advantagecus to specify the Taylor Mesaba brand and look for these names on the padlock link.

In view of its past record and its excellent reputation both for quality and fair dealing, we predict many more years of success for the S. G. Taylor Chain Company.

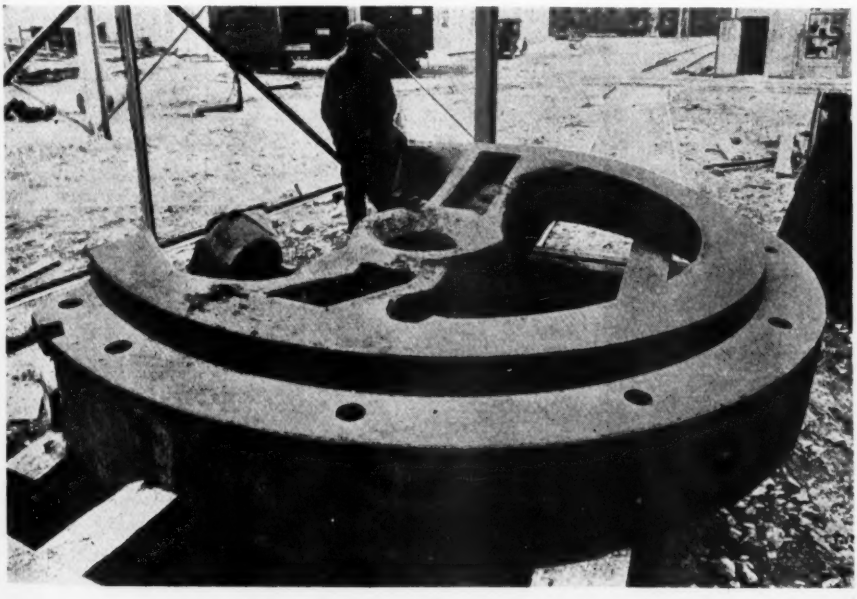
When a Casting Breaks.

The breaking of a crusher part, such as is illustrated on this page, is a calamity in any plant.

If the part is to be replaced with a new casting, this means usually a delay of several weeks and an expense of several hundred dollars. Such parts can, however, be welded together right at the plant, thus occasioning a delay of only a few hours.

Crushers of this type have been welded by the Oxweld process, controlled by the Oxweld Acetylene Company of Chicago. Full particulars will be given by the company to anyone who is interested.

The Wolverine Stone Company, Detroit, Mich., has incorporated with a capital of $50,000. The incorporators are Albert A. Albrecht, Wm. B. Gregory, and Wm. A. Hubbard.



Plants should be prepared to take care of an accident like this

HYDRAULIC METHOD OF STRIPPING.

Where conditions permit of using the hydraulic method of stripping a deposit, it is stated by W. H. Wilms, writing in Engineering News, that the work is accomplished by this means at a cost far below that of any other.

The conditions necessary for hydraulicking are a plentiful supply of water, a disposition for the overburden, drainage for the waste water, and ample grades for the flumes or sluices carrying the material. After a gravel bank is opened up the overburden may be deposited directly on the floor or bottom of the pit, provided there is means of drainage to carry off the waste water. Small levees are built up of gravel, backed up with brush to retain the material and prevent overflowing. Sewer pipe or box drains are placed in the center of the pond thus formed, their tops flush with the pond level.

Another method of retaining the the material where disposition is made in the bottom of the pit is by means of sheerboards. This method, known as sheerboard construction, is largely used in the building of dams and fills by hydraulicking. Under many conditions it is cheaper and more effective than the the construction of earth or gravel levees. In this method the materials are retained by two or more small bulkheads or sheerboards made of two 1x12-inch boards, nailed to 2x4-inch stakes about 7 feet long. The 2x4's are pointed at one end and driven into the ground on about 4-foot centers.

After the material is carried up to the top of the first row of sheerboards, a second row is built from 4 to 7 feet back of the first. The bottom of this top sheerboard is placed from 5 to 10 inches below the top of the lower bulkhead to prevent the material from bulging and flowing out between the two bulkheads. The amount of seal necessary depends upon the nature of the material being handled. In ordinary loam 6 inches has proven effective while in fine clay or sandy loam 10 inches is often necessary. As many sheerboards are built in the above manner as are necessary to take care of the stripping over a given area. In this method the water is taken off through spillways which lead to the pipe drain or to some natural drainage course.

If no natural outlet for drainage exists it may be necessary to install a centrifugal pump to take care of this water. Where a small yardage only is required per day, it is often possible to let seepage and evaporation take care of this water, provided there is no natural outlet. However, drainage is always to be preferred and generally is a necessity. Where seepage and evaporation are depended upon to any extent, the bottom is soon silted and clogged up, resulting in the overflow of the levees and break-throughs. Where disposition is made in the bottom of the pit, the fall necessary for the flumes from the top of the gravel bank to the waste pond is generally ample.

The character of the overburden must be such as to be easily handled with water. Clay is generally a very difficult material to handle, requiring more water, greater pressure, and greater flume grades to handle, than ordinary loam or dirt. The amount and size of rocks, if any, also affect the efficiency of this method.

No rules can be laid down for the quantity of water required per cubic yard of material removed, pressure of water necessary and the grade of flumes required; these factors depend entirely upon the nature and character of the material to be handled. There is sometimes found a fine, heavy, dead sand on top of the gravel deposit which requires nearly twice the amount of water, pressure and flume

grades to carry it than the soil above. The quantity of water is generally more important than the pressure. Comparatively light grades can be used for the flumes if a sufficient quantity of water is present to effect complete suspension. As heavy grades as possible should be used however, for the greater the grade the less the dirt has to be carried in suspension, with a consequent increase in the carrying capacity of the water.

An overburden composed of soft loam with no rocks or boulders and no dead sand to contend with has been removed with flume grades of 8 per cent and a delivery of 1,500 gallons of water per cubic yard of material removed. A pressure of 75 pounds per square inch was used.

Due to the comparatively shallow working face and the consequent frequent changing of pipe connections, and flumes, hydraulicking, when applied to gravel stripping, does not show the same degree of efficiency and economy that can be obtained under the more favorable conditions of a high working face. Even under such adverse conditions, however, the economy that can be obtained by this method where the other conditions are favorable is very great.

Electric Power.

Pertinent to the subject of electric power is the following from the report of the Committee on Electricity in Rural Districts of the National Electric Light Association:

"Motor drive and central station service have been thoroughly tried out in this industry (sand and gravel). The flexibility of motor drive is of great value here. Putting individual motors on distant pumps and outlying belts dispenses with the operating troubles from long steam lines and long rope drives. On account of pumps being of considerable size and located several hundred feet from the screening plant, the use of 440-volt motors will in most cases be found desirable.

"The sand and gravel season closes as soon as the ground is frozen and plants shut down at dark, so that the load is strictly 'off peak.' Some attempt has been made to do dry screening in winter but with small success.

"A combination of individual and group drive will be found most advantageous in crusher plants, and the use of 440-volt motors will generally prove best. Crushers should be driven by slip-ring motors. If a crusher is shut down when it is full of rock it is often a troublesome job to clear it of all rock before starting up again. This is especially true if the crusher is driven by a squirrel-cage motor. If a slip-ring motor is used and the crusher belt is backed up a few feet by hand, the motor will often be able to start the crusher without its being necessary to clean out the rock. Dust-proof bearings should be used on all stone-plant motors, and it will usually pay to install all wiring in conduit."

The Burton-Townsend Company of Zanesville, Ohio, has just purchased the large sand holdings of the Muskingum Valley Sand Company in Zanesville and Duncan Falls. The deal means a transfer of a very large acreage of moulding sand and as a result of the acquisition the Burton-Townsend Company will double their output. The erection of two large sand mills will be started at once and when they are in operation the capacity of the company will reach 1,000 tons of moulding sand per day. The property also gives the Burton-Townsend Company a wider range of moulding sands now being used by foundries. The deal was closed by Mr. Burton, president of the Burton-Townsend Company, and Mr. John Winefordner, a representative of the Muskingum Valley Sand Company. Mr. Burton states that the value of Zanesville sand is being more and more appreciated by the trade and he is greatly pleased at being able to acquire this valuable deposit of sand. By increasing their output the Burton-Townsend Company will give employment to many additional men.

Quick Work Erecting Big Stack At Ottawa.

Erection of a 110-steel stack recently for the Ottawa Stone & Sand Company, Ottawa, Ill., in a space of three hours by four laborers under a foreman, using a block and tackle system, makes an interesting story, the particulars for which are furnished Pit and Quarry by the American Quick Shovel Company, of Chicago.

The dimensions of the stack were as follows: Length over all, 110 feet; diameter, 60 inches. Thickness of shell: First third of length, ⅜ inch; second third, $\frac{5}{16}$ inch, and last third, ¼ inch.

The stack was delivered at the plant in six sections of about equal lengths. These sections were laid in line with the base of the bottom section as close as practical to the foundation, and riveted together on the ground. The foundation was constructed to project 12 inches above the ground, this projection being round and somewhat smaller than the inside diameter of the stack to insure a loose and easy fit.

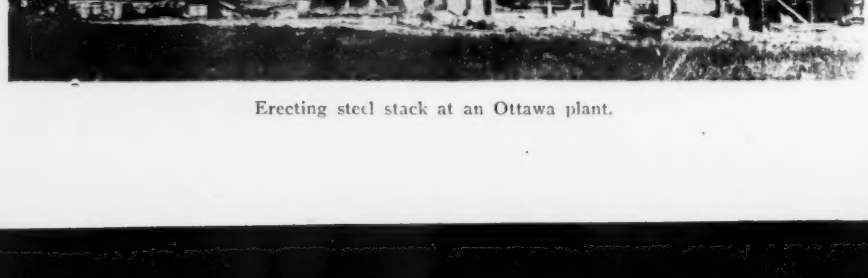
After being riveted and lined out and painted the stack was provided with straps and slings for receiving the wire cables.

There were no braces or reinforcements on the inside of the stack with the exception of that section nearest the base. In that section an opening had been cut for receiving the flue box from the boiler. Here were used three braces in the shape of crosses.

The next step was to place the hoisting plant. A single drum hand hoist was located on the foundation of a No. 5 gyratory crusher. There was then erected, at a point two-thirds of the distance from the foot of the stack to the crusher, an 8x8-inch timber, 35 feet from the top of which eight buy wires were anchored to the ground and to the crusher. At the top of this timber there was fastened a four-block tackle and two snatch blocks with large sleaves for 1⅛-inch rope.

At the stack two 8 to 16-inch telegraph poles were used, having been braced horizontally and bolted together in the sape of an "A" frame and laid out along side the stack. At the top of this "A" frame there was fastened a five-block tackle and one double block for cables leading to the stack. These cables were made fast to the stack at a point midway between the middle and top of the stack, the five-part block being part of the tackle used in the final hoisting.

To equalize the pull and variation in the length of these cables while the stack was being raised a single block was fastened to the stack lo-



Erecting steel stack at an Ottawa plant.

We Are the Pioneer Manufacturers of Gravel Washing Machinery

The first gravel washing plant was an "S-A" Plant. We developed the original gravel washing machinery which is still recognized as standard. In fact, the records will show that we actually developed the industry.

Altogether in the past fourteen years we have designed and equipped about 400 gravel washing plants. Each one of these was especially designed—each one has been a *commercial success*. We have turned down orders for a number of plants where the elements of success where lacking. We have turned failure into success for several others by re-equipping with "S-A" Machinery.

We have a strong organization of engineers—and a large plant devoted to the manufacture of the highest grade of conveying elevating, screening and transmission machinery.

It is to your interest to deal with manufacturers and not jobbers.

"Ask the Man Who Owns One"

The following is an incomplete list of the newer "S-A" plants

Gravel Washing

Los Angeles Rock & Gravel Co.
Scottsville Sand & Gravel Co.
Montana Concrete Co.
Vandalia Railroad.
Standard Builders' Supply Co.
Hawarden Sand & Gravel Co.
H. D. Conkey Sand & Gravel Co.
F. A. Downs Construction Co.
Mason City Sand & Gravel Co.
Jensen & Jensen.
Virginia Sand & Gravel Co.
L. D. Burd.
Wabee Gravel Co.
Summit Sand & Gravel Co.
Geo. J. Hoffman.
Logansport Gravel Co.
Battjes Fuel & Supply Co.
Wabash Sand & Gravel Co.
Macksville Gravel Co.
Mason City Sand & Gravel Co.
Covington Sand & Gravel Co.
American Agricultural Chemical Co.
Madison Construction Co.
Windsor Sand & Gravel Co.
Atwood Davis Sand Co.
Lake County Gravel Co.
Chas. Vivian.
Vigo Washed Sand & Gravel Co.
Interstate Material Co.
H. W. Hawly.
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Stone Washing

Brownell Improvement Co.
Peoples Crushed Stone Co.
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"S-A" Equipped Crushing Plants

A. C. Laughlin Stone Co.
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National Lime & Stone Co.
Bessemer Limestone Co.
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Blair Limestone Co.
Standard Lime & Stone Co.
Union Lime Co.
Elmhurst & Chicago Stone Co.
Leathem & Smith.
Greenleaf Stone Co.

We'll gladly supply the address of any of the above for reference or send names of "S-A" plants in your territory

Put your proposition up to us and we'll help you make it pay

Stephens-Adamson Mfg. Co.

Aurora, Ill.

cated midway between the two outside cables. These cable connections were made while the "A" frame was laid out alongside, with its base against the foundation of the stack.

The hoisting rope used was an 1⅛ manila transmission rope of a length totalling about 1,400 feet. This was pulled through the blocks with one end anchored to the crusher and the other leading to the hoist. The first and last lines of these ropes were led over snatch blocks on the 35-foot pole, with eight ropes pulling direct against this mast.

With everything in readiness as described above, the hoisting was begun with four men, two at either side of the hoist. The "A" frame was raised into a position of 45 degrees to the horizontal before the raising of the stack was begun.

At this point the greatest stress occurred in all cables and ropes. Had not the theoretical calculations of the stresses been correct, a failure would have occurred at this point and the rigging would have broken down. As there was no fault apparent the hoisting was continued and, at the end of three hours, the stack was riding easily in its place with all guys temporarily fastened.

The cost of the work was not kept in such a way that it could be itemized, but the total cost, including the riveting, painting, erecting of masts and raising and fastening the guys—not including any material—was $175.

The erection of the stack was planned and personally directed by Mr. Theodore Ahlborn, of Chicago, a practical and experienced engineer and contractor who specializes in mines and quarries, and who was awarded the contract for the construction of the new plant of the Ottawa Stone & Sand Company.

The foreman on the job of raising the stack was an expert millwright, receiving $0.75 an hour, while the common laborers employed in hoisting received $0.35 an hour. A great deal of the machinery used by Mr. Ahlborn on his jobs is furnished by the American Quick Shovel Company, who furnished the details for this story.

New Silica Plant.

The Ottawa Silica Cmpany, Ottawa, Ill., has announced the completion of plans and specifications for a new $150,000 plant to be constructed to the south of the two present mills on Valley Addition to the city of Ottawa.

The addition of this new mill to the present two operated by the company gives to the Herring Brothers, James and Charles B., the ability to turn out the finest grade of silica on the American continent for marketing purposes.

The new mill gives assurance of being the most modern of its kind in the world. Only the very latest machinery will be used in washing and drying the materials. The structure will be entirely of concrete, and the capacity will be sixty cars per day. The plant will be electrically equipped throughout. The buildings will be larger than either of those now owned by the company.

Construction began January 1, and completion is scheduled for June 1, at which time the manufacture of silica will be well under way in the new plant.

FOR SALE
One Lidgerwood 4-ton 1200 ft. span
CABLEWAY
complete with engine, head and tail towers and with or without boiler.
One Dixon 10 x 16 x 18-ton 36-inch gauge saddle tank **LOCOMOTIVE**
JOHNSTOWN WATER CO.
332 Locust St. Johnstown, Pa.

FOR SALE

18x36 Blake Jaw Crusher.
No. 6 Austin Crusher.
1-40 C. Bucyrus Shovel.
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80-4 yd. Western Cars.
3 Baldwin 10x16 Dinkeys, 36 in. Gauge.
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2 Draglines.

DONAHUE & CO.
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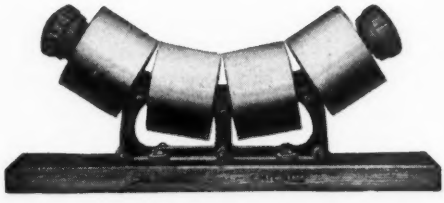
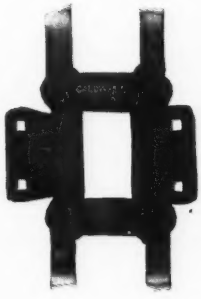
CALDWELL MACHINERY

FOR HANDLING

Stone, Gravel, Sand





Screw and Belt Conveyors, Steel Elevator Casings and Buckets, Gears, Cut and Cast Teeth, Link Chain Belting, Shafting, Pulleys, Sprocket Wheels, Etc.

H. W. CALDWELL & SON CO.

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WHAT SOME OF THE READERS THINK OF US

I have never spent a similar amount of advertising money that got anywhere near the immediate returns. In fact, the returns received from this ad are the most remarkable that I have ever experienced. I have had letters and wires up to a number of at least 100 inquiries from this little ad in one issue, all from actual buyers.—G. C. Marsh, President, G. C. Marsh & Co., Chicago.

We know it will be of value to us and you will no doubt hear from us in the near future, as we expect to be in the market for equipment for sand and gravel handling.—W. E. Dyer, Manager, The Wiselogel Co., Muskegon, Mich.

Your first copy fills a void long felt by the sand and gravel companies and I would like to be one among the number to wish you success.—R. H. Eastwood, Missouri River Sand & Gravel Co., Grayville, Ill.

We have received your first issue of Pit and Quarry and can assure you that not only have we enjoyed every page of its editorial pages, but we have also found your advertising pages interesting as well as instructive. The arrangement and variety reveal a judgment on the part of your editor which should be highly commended.—O. L. Larsen, Roseburg Sand & Gravel Co., Roseburg, Ore.

I have seen your first issue and am writing one of your advertisers today regarding pulverizers. I expect to open up a quarry in the near future.—N. H. Turner, Electric Company, Vulcan, Mich.

Allow us to congratulate you upon the first number of your magazine. It is a very nice little publication and we believe will be well received and appreciated by those who read it.—A. A. Smock, Mansfield Engineering Co., Indianapolis, Ind.

We have for a long time felt that the sand and gravel industry of the country was of sufficient magnitude to support a trade paper of its own, and sincerely trust that the support and cooperation you will receive will enable you to continue your publication which we will be very glad to receive as issued.—E. E. Squier, Ed. E. Squier Company, St. Louis, Mo.

It places us in touch with a line of manufacturers whose material we can use.—G. A. Resek, Secretary, The Lorain Sand & Gravel Co., Lorain, Ohio.

Acknowledging receipt of your first issue of Pit and Quarry will say that this paper will indeed fill a long felt want. I find the information contained therein of the greatest value and interest and would gladly co-operate with you in making your paper a success.—G. A. Seviour, Pit Manager, United Fuel & Supply Co., Detroit, Mich.

I must say that this paper is a good one, and I predict a great future for it.—Henry Turner, Poplar Bluff, Mo.

Reads pretty good to me! Have written several of your advertisers mentioning Pit and Quarry.—H. R. Gill, Island Sand & Gravel Co., Columbus, Ohio.

When you think of cars —think of "Continental"

We specialize on heavy duty cars for all kinds of QUARRY SERVICE

Our "Class H" 2-way side dump cars, built for handling huge boulders, incorporate many radical improvements over the ordinary dump car.

ONE & TWO SIDE DUMP CARS
GABLE BOTTOM & HOPPER BOTTOM CARS
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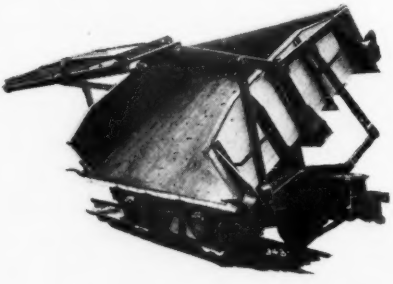
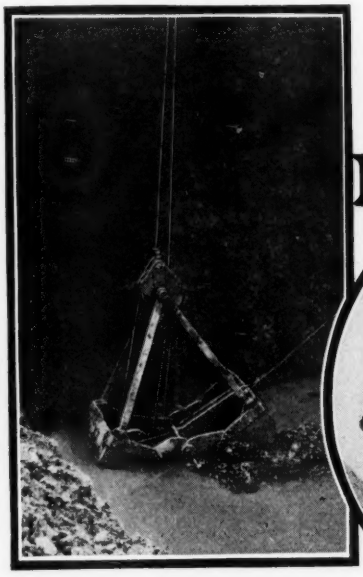
A car for every purpose



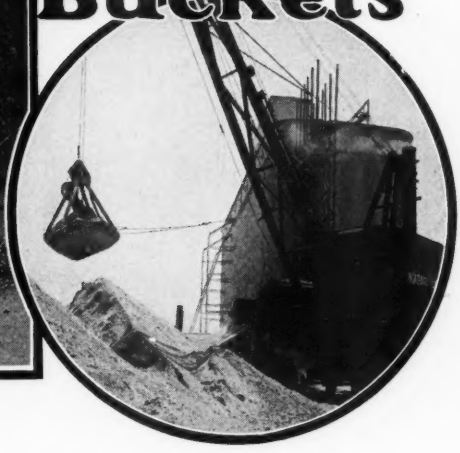
It will pay you to get in touch with us

CONTINENTAL CAR CO., Inc.

GENERAL SALES OFFICE
PIERCE BUILDING ST. LOUIS, MO.
Works; LOUISVILLE, KY.



Blaw Buckets



You sand and quarry men know what *Blaw Service* means

The big *Blaw Organization* stands behind the Blaw Bucket

The Blaw Bucket has demonstrated in service its greater speed, its digging power, its common sense design, its strength. In competition with other buckets, it has shown greater yardage.

Find out for yourself how practical Blaw Buckets are. Send us a description of your excavation or rehandling problems. Blaw Buckets are ready for immediate shipment.

Blaw Steel Construction Co.

Suite 605 Farmers Bank Bldg.

PITTSBURGH, PA.

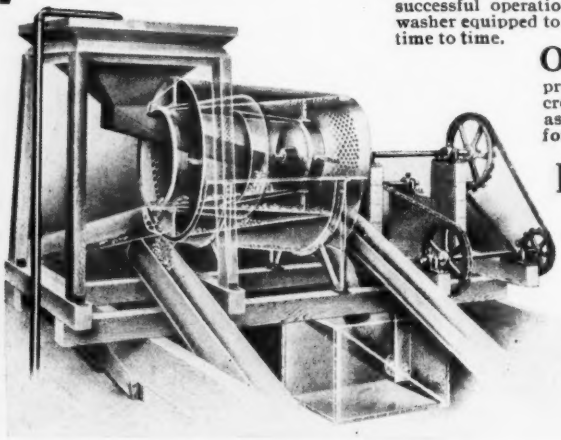
SMALLER
—initial outlay
—operating cost
—space required
—expense for auxiliary machinery

NEW and BETTER

The Biesanz Sand and Gravel Washer is marketed "by request"—in answer to a call to benefit the trade with a money-saving, space-saving, equipment-saving, better product machine—though it was first made for their private use. The

BIESANZ Sand and Gravel Washer

is "different" in these respects; "Nested" screens economize space; the larger-perforated screens having the small surface; the output is uniform; does away with the necessity of high bins, large space, long shaftings, numerous sprokets and high-powered drive. Now in successful operation in large and small plants. Our washer equipped to start with. It can be added to from time to time.



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presents itself in this machine for concrete products manufacturers as well as the sand and gravel man. Write for particulars.

Biesanz Stone Co.
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GREATER
—uniformity of screen capacity
—daily output
—all around profit

FOR SALE
3 Star and 3 Keystone
Drilling Machines
Suitable for blast hole work.
Ready to ship.
Box 1241 Providence, R. I.

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All makes, types and sizes, steam and power driven and for various pressures, guaranteed condition. Some are factory repaired. **Twenty years' experience with compressed air apparatus at your command.** Send me your inquiries.
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Colorado Building Washington, D. C.
CONSULTING ENGINEER

Difficult sand and gravel washing problems a specialty. Complete plans suited to each particular case. No connection with any equipment concern or builder.

Operating as Well as Designing Experience

Come To Us

For dependable "used" equipment and machinery within the following lines:

Steam Shovels
Locomotive Cranes
Locomotives
Cars
Rails
Air Compressors
Hoisting Engines
Derricks
Grab Buckets, Etc.

WM. B. GRIMSHAW CO.
1044 Drexel Bldg. Philadelphia, Pa.

Locomotive Cranes and Steam Shovels

Switching Engines
(Standard gauge and dinkies)

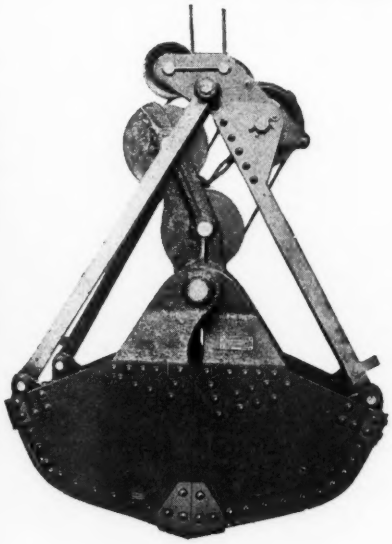
FREIGHT CARS, FROGS, SWITCHES and SWITCH STANDS

One new 500 h. p. Erie City vertical water boiler with fixtures complete. Never been used. Also 150 ft. steel stack 60 in. diameter.

AMERICAN RAILWAY EQUIPMENT COMPANY
Diamond Bank Bldg., PITTSBURG, PA.

Long Life and Efficient Service are Characteristics of the

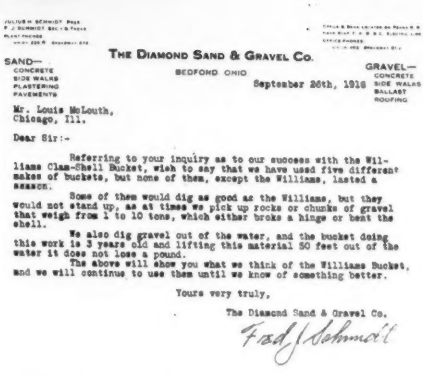
WILLIAMS BUCKETS



because they are built of steel on designs which embody the right mechanical principle.

Simple in construction; bearings, few and extra large; all sheaves bronze bushed; cables perfectly guarded; alignment of sheaves exact at all times; scoops heavily reinforced and so constructed that there is absolutely no side movement; powerful and speedy closing arrangements.

—These are a few of the features that help to make our repair part business so small.



THE DIAMOND SAND & GRAVEL CO.
BEDFORD, OHIO

SAND— CONCRETE, SIDE WALKS, PLASTERING, PAVEMENTS

GRAVEL— CONCRETE, SIDE WALKS, BALLAST, ROOFING

September 26th, 1916

Mr. Louis McLouth,
Chicago, Ill.

Dear Sir:-

Referring to your inquiry as to our success with the Williams Clam-Shell Bucket, wish to say that we have used five different makes of buckets, but none of them, except the Williams, lasted a season.

Some of them would dig as good as the Williams, but they would not stand up, as at times we pick up rocks or chunks of gravel that weigh from 1 to 10 tons, which either broke a hinge or bent the shell.

We also dig gravel out of the water, and the bucket doing this work is 3 years old and lifting this material 50 feet out of the water it does not lose a pound.

The above will show you what we think of the Williams Bucket, and we will continue to use them until we know of something better.

Yours very truly,

The Diamond Sand & Gravel Co.

Fred J. Schmidt

Built in types and sizes for every purpose.
Catalog by return mail on request.

THE G. H. WILLIAMS CO.

General Office and Works, ERIE, PA.

RUDDOCK BUCKETS

A one-yard Ruddock Bucket
digging sticky material

Ruddock Buckets will *outdig* and *outlast* all other buckets

See our exhibit at the Cement Show in Chicago Feb. 7th to 15th

WRITE *WIRE* *TELEPHONE*

The Ruddock Bucket Co.

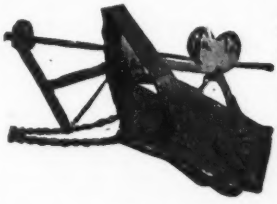
Cleveland, Ohio

DULL EQUIPMENT

Progressive and sucessful producers of sand and gravel are using Dull equipment. Dozens of Dull designed plants throughout the country are daily proving our ability to handle the most difficult problems in this field.

The cut on the left shows two rows of the well known Dull Inclined Conical Screens.

Where the material shows a high content of clay or other undesirable materials, it is expedient to run them through a preliminary Scrubber, as shown at the top of the picture on the left. The use of this Scrubber results in cleaner materials, and thus adds greater sales value to your product.



In no other case has the success of the Raymond W. Dull Co. as a designer and builder of Complete Sand, Gravel or Crushed Stone plants, or of equipment for such plants, been equalled. We designed and built the largest sand and gravel plant in the world. Above is a bucket of especial merit for use in pit or quarry. Below is the Dull Conical Sand Separator.

Write for the Complete Dull Catalog

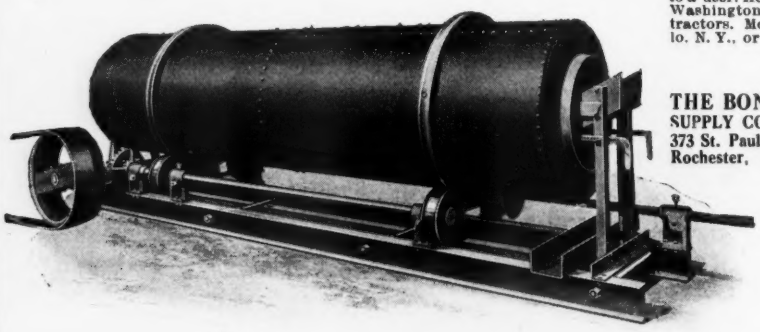
The RAYMOND W. DULL CO., 111 W. Washington Street, CHICAGO

The Rapid Sand and Gravel Washer

You can convert dirty sand and gravel unto the very finest quality and material for concrete in record time and at rock bottom cost, with a RAPID Sand and Gravel Washer. A *scouring* motion is the answer. The final step in the operation is a thorough rinsing in fresh clean water.

Despite its thoroughness, the process is very rapid. These properties are *permanent* in this machine; it is very sturdily constructed, cylinder of heavy steel, riveted. It is made in four capacities.

If you care to know what the RAPID can really do, write to a user. Hembt & Washington, Contractors. Monticello, N. Y., or to us.



THE BONNEY SUPPLY CO., Inc.
373 St. Paul Street
Rochester, N. Y.

IMMEDIATE DELIVERIES—LOW PRICES—FIRST CLASS PLANT

Eighteen Western 12 yard standard gauge air dump cars.
Fifty-two Western 4 yard 36 in. gauge dump cars.
Twenty-three hundred Dinkey ties for 36 in. gauge track.
A number of Vulcan, Porter and Davenport Locomotives, 24, 36, 42 in. and standard gauge. Ranging in size from 6 to 60 tons.
A number of steam shovels, both revolving and railroad types, all sizes.
Portable track, relaying rails in all sizes.

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CONTRACTORS' MACHINERY & SUPPLY CO.

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PERFORATED METALS and SCREENS OF ALL KINDS

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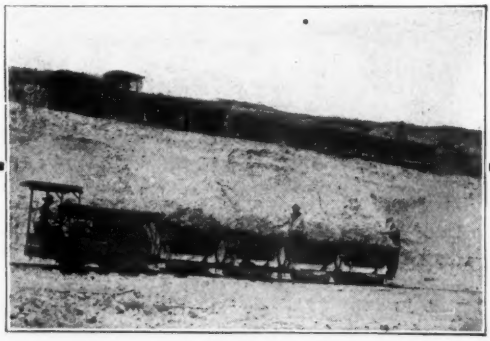
New York Sales Agent for the

"Plymouth" Gasoline Industrial Locomotive

MADE BY THE
J. D. FATE CO.



Two Plymouths at Shale Bank of Lincoln City Products Co.

"Plymouth Does as Much as Sixteen Men and Horses"

—Says Dillman

President M. J. Dillman, of the Lincoln Clay Products Co., Lincoln, Calif., replaced sixteen men and sixteen horses with his first Plymouth Gasoline Locomotive, doubling production and cutting cost in two. Now he has added another Plymouth to his equipment because he has found that—

The Plymouth

Gasoline Industrial Locomotive

Has These Six Points of Superiority

1—It costs less to buy. 2—It costs less to install. 3—It costs less to operate. 4—it costs less to maintain. 5—It has greater draw-bar pull. 6—It has greater traction pull, per rated tonnage.

President Dillman Proves This—He Says:

"No use to talk to us of the saving, as well as the expedition of the work. There is no comparison as to cost of installation between horses and The Plymouth, nor as to operation. The Plymouths answer our purpose better tha any other system. We think The Plymouth will do much more than we have asked of it. We replaced sixteen horses and their drivers with the first Plymouth."

GET THIS BOOK Our new book—just off the press — tells the complete story of this particular installation and of some 34 other installations, giving full description, cost data and valuable information regarding haulage problems similar to your own. Your copy is ready —send for it today.

THE J. D. FATE CO.
206 Riggs Ave., PLYMOUTH, OHIO

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The J. D. Fate Co., Plymouth, Ohio.
206 Riggs Ave.,
Send the booklet, "Cutting Haulage Costs," advertised in Pit and Quarry. This does not obligate me in any manner.

Firm name .....
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Standard
DETROIT USA

Over 65% of the Orders for Standard Trucks Are "Repeats."

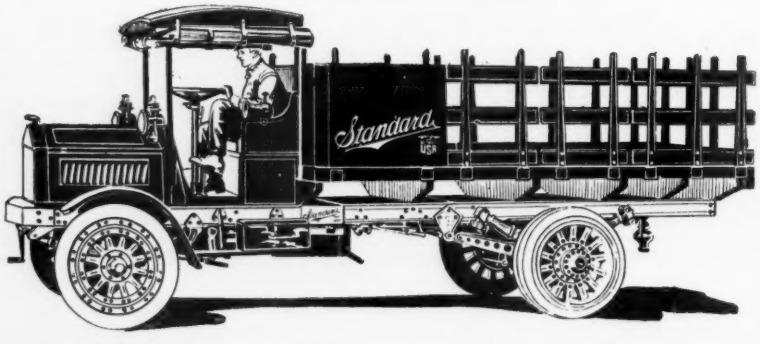
"Repeat" orders indicate satisfied owners. The name "Standard" on a motor truck means all that the word implies. It insures durability, service and satisfaction and the purchase of a Standard Truck is an assurance that your investment will have a higher net earning power, both in truck value and of continuous service. No better proof of this statement is offered than that 65% of the present owners have repeated their orders. This high percentage of "repeat" purchasers, by referring to transportation experts, know exactly how to make comparison and have given the STANDARD TRUCK preference in almost every comparison of value, accessibility, durability, economy and performance.

Cement dealers, contractors and builders have proved to themselves, beyond the question of any doubt, that the STANDARD Truck is the most reliable and profitable investment that they can make, because the design and construction is standard and standardized in every unit.

Are you familiar with the latest STANDARD model? If not, write for catalogue 26-B and list of STANDARD owners, furnished free upon request.

STANDARD MOTOR TRUCK COMPANY

DETROIT, MICHIGAN



Free Service to our readers

For the convenience of our readers our "Free Service" department will furnish on request any information, catalogs and prices on any machinery, equipment or supplies used in pits and quarries. The coupon below makes it easy for you. Simply check, sign and mail. There is no charge.

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PIT & QUARRY, 527-529 S. La Salle St., Chicago, Ill.

Research Department,
Pit and Quarry,
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Please secure for me ☐ catalogues, ☐ prices and ☐ other information, pertaining to those items checked below:

☐ Locomotive Cranes.	☐ Screening Equipment.	☐ Belting.
☐ Steam Shovels.	☐ Washing Equipment.	☐ Motors.
☐ Dragline Excavators.	☐ Buckets.	☐ Gasoline Engines.
☐ Hydraulic Dredges.	☐ Crushers.	☐ Drills.
☐ Wire Rope.	☐ Gasoline Locomotive.	☐ Loaders.
☐ Blast Hole Drills.	☐ Locomotives.	☐ Unloaders.
☐ Blasting Powder.	☐ Conveying Buckets.	☐ Crushing Plants.
☐ Hoists.	☐ Motor Trucks.	☐ Dynamite.
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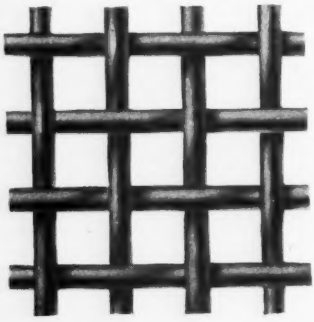

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Especially adapted for SAND and GRAVEL Screens.
A large stock of the various meshes always on hand.

Prices right—Catalog on request

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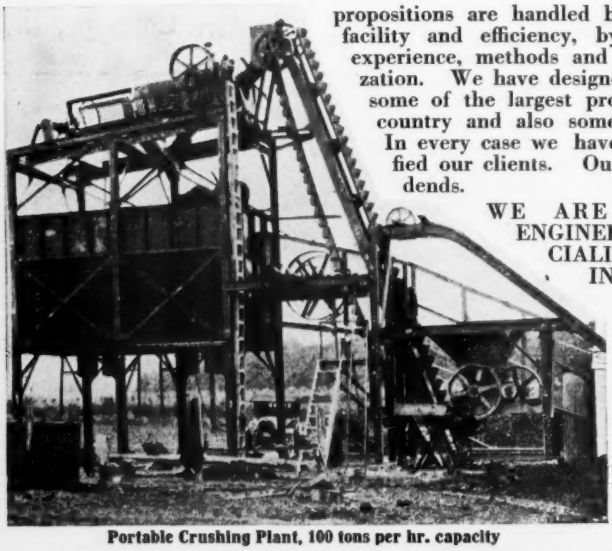
3573-81 E. 78th STREET, CLEVELAND, OHIO

Large or Small



Portable Crushing Plant, 100 tons per hr. capacity

propositions are handled by us with equal facility and efficiency, by reason of our experience, methods and superior organization. We have designed and supervised some of the largest propositions in this country and also some of the smallest. In every case we have absolutely satisfied our clients. Our plants pay dividends.

WE ARE PRIMARILY ENGINEERS AND SPECIALISTS IN SELECTING EQUIPMENT.

We Specialize in heavy duty Automatic operation.

INVESTIGATE OUR LIME HYDRATOR AND POIDOMETERS.

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Quarry Operations
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Stone Crushing Expenses

Can be reduced in your plant as they have been in others.

Operating expenses in most plants can be lowered by improving the methods of operation and by installing more economical machinery.

The increased profits will pay many times for the cost of the changes.

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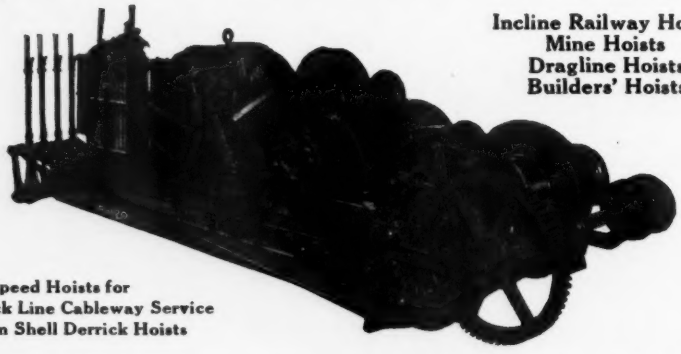
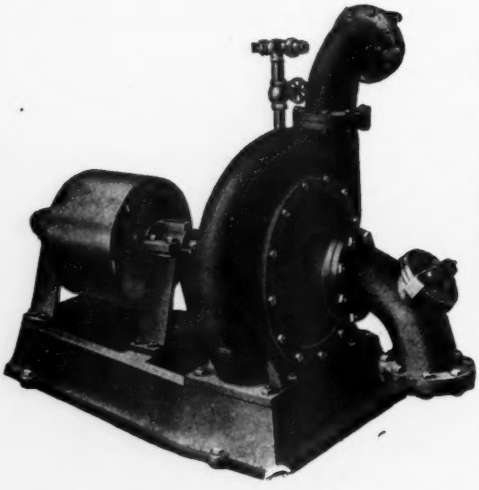


Two Speed Hoists for
Slack Line Cableway Service
Clam Shell Derrick Hoists

In Thomas Hoists are embodied the results of 20 years' experience devoted to exclusive manufacture of Hoists. We make a hoist for every class of service and have built our reputation on **Quality.** Write for catalog.

Manufactured by **Thomas Elevator Co.** 32 S. Hoyne Ave. CHICAGO, ILL.

BRANCH OFFICE: 126 Pine St., SAN FRANCISCO, CAL.



For handling sand, gravel, and other solids in suspension at a minimum cost, use

Erie Sand-Gravel Dredging Pumps

Small sizes as well as largest ones are designed to give maximum output and greatest wear for a given weight.

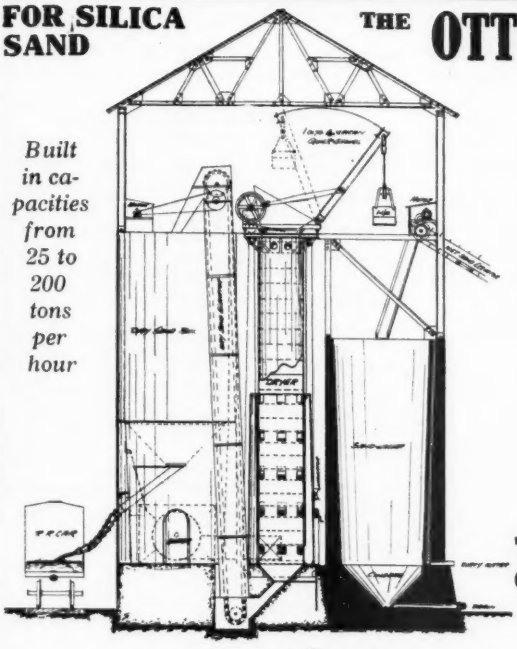
Tell us your conditions and ask for Bulletin P-30

ERIE PUMP & EQUIPMENT CO., Erie, Pa.

FOR SILICA SAND

THE OTTAWA DRYER

Built in capacities from 25 to 200 tons per hour



SECTIONAL ELEVATION

The Ottawa Dryer consists of a series of concrete washing bins, and, in the center, a drying tower, surmounted by a one or two yard Quick Shovel, which delivers material from washers to dryer. The dryed material is mechanically deposited in a bin which is directly above the fan and steam box; thus much heat is advantageously absorbed. Obviously the Ottawa Dryer represents the most compact, economical and efficient process of washing and drying silica sand.

Full Particulars on Request

THE AMERICAN QUICK SHOVEL CO.
122 So. Michigan Blvd.
CHICAGO

THE PURCHASING AGENT

earns his salary because he knows values. By long and careful study of printed catalogs, by patient comparison of machine with machine, product with product, material with material, he becomes familiar with those machines, materials and products which it is his business to know.

Purchasing, however, is only one of the contractor's important duties. Yet to buy advantageously he must be thoroly familiar with machines and products. Trade paper ads and catalogs cannot supply full information. Fair comparison can only be made where machines and equipment are brought close together, to be studied point by point. There is only one such place—

The Tenth Chicago Cement Show

Coliseum and Balcony, February 7-15, 1917

It will give the contractor an opportunity to study values. With a week in which to study the machines and products—the actual equipment which enters into his business—the contractor may acquire easily the information necessary to careful purchasing. Why not save time which will be much more valuable during the building season by getting a line on the equipment displayed at the Show? Make your arrangements now to attend.

Under management of

CEMENT PRODUCTS EXHIBITION CO.
210 South La Salle Street, Chicago

CHICAGO CONVENTIONS DURING SHOW PERIOD

AMERICAN ASSOCIATION OF ENGINEERS, La Salle Hotel, Chicago, February 8, 9, 10, 1917.
AMERICAN CONCRETE INSTITUTE, La Salle Hotel, Chicago, February 8, 9, 10, 1917.
AMERICAN CONCRETE PIPE ASSOCIATION, Auditorium Hotel, Chicago, February 12, 13, 14, 1917.
ILLINOIS LUMBER & BUILDERS' SUPPLY DEALERS' ASSOCIATION, Sherman House, Chicago, February 14, 15, 16, 1917.
NATIONAL BUILDERS' SUPPLY ASSOCIATION, Sherman House, Chicago, February 12, 13, 1917.

CONCRETE FOR PERMANENCE

MARSH'S GUARANTEED LIST

CRUSHERS

1 No. 2 Gates D.
1 No. 3 McCully.
1 No. 4 Austin.
1 No. 5 Gates K.
1 No. 6 Gates D.
2 No. 7½ Gates D. & K.
1 No. 8 Gates K.
1 No. 9 Gates D.
1 No. 12 Gates complete plant.
1 48x60 Gates jaw.
Can furnish elevators and screens with all of these.

SCREENS

1 48" x 17' Gates screen, complete.
1 60" x 20' Gates screen, complete.
1 48" x 24' Screen, complete.

ROLLS

2 36" x 22" Buchanan Rolls.
1 36" x 16" Superior sand rolls.

CEMENT MAKING MACHINERY

2 5' x 22' Allis-Chalmers tube-mills.
9 6' x 60' Cement kilns, complete.
10 Kent mills.

LOCOMOTIVE CRANES

1 20-ton Brownhoist 8-wheel 50' boom.
1 25-ton Industrial (Bay City) crane, 8-wheel M. C. B. 50' boom.
1 20-ton Ohio 8-wheel M. C. B. crane, 50' boom, 1½-yard bucket.
1 No. 1 Browning 4-wheeled, bargain.

COMPRESSORS

3 Laidlaw-Dunn-Gordno 30x20x20 belt-driven compressors, capacity 2,870 ft. per min., complete with motors.
3 Ingersoll-Rand "Imperial 10," class X-B-2 belt-driven compressors, capacity 2,400' per min., 28x17x24.
1 Knowles-Blake 16x10x10 belt-driven compressor, 430' per minute.
1 Ingersoll-Rand class N-E-1 belt-driven compressor, 300' per min., and a lot of steam driven.

STEAM SHOVELS

1 Model "250" Marion revolving stripping shovel, with drag-line equipment.
1 Model "100" Marion 5-yard shovel, 136-ton, railroad trucks.
1 Model "91" Marion, 103-ton, 5-yard shovel, railroad trucks.
3 Model "75" Marion shovels, 3-yard dipper, 96-ton.
3 Model "70-C" Bucyrus shovels, 2½-yard dippers, 80-ton.
1 Model "28" Marion traction revolving shovel, 18 tons, ⅝-yard.
3 Type "O" Thew traction revolving shovels, 18 tons, ⅝-yard.

LOCOMOTIVES (STANDARD GAUGE)

3 Baldwin Consolidation, 20x24, weight 70 tons each.
1 19x26 Baldwin 10-wheel locomotive, 180-pound pressure.
1 65-ton Shay geared locomotive, standard gauge.
1 15x22 Baldwin 4-wheel saddle-tank, weight 25 tons.

LOCOMOTIVES (NARROW GAUGE)

8 10x16 Vulcan 36"-gauge 18 ton locomotives, steam-brake.
4 11x16 Porter 36"-gauge 18-ton saddle-tank locomotives.
2 7x12 24"-gauge 9-ton saddle-tank locomotives.

CARS (STANDARD GAUGE)

50 hopper-bottom 60,000-pound capacity coal cars.
100 Western 12-yard two-way air-dump cars.
25 Oliver 12-yard two-way air-dump cars.
13 Oliver 6-yard two-way air-dump cars.

CARS (NARROW GAUGE)

100 4-yard Western two-way dump cars, 36"-gauge.
25 3-yard Western two-way dump cars, 36"-gauge.
20 36"-gauge 2½-yard end-dump quarry cars.
10 24"-gauge 2-yard end-dump quarry cars.

HOISTING ENGINES

1 10x12 3-drum Lidgerwood cableway engine, 50 H. P.
2 8½x10 Lidgerwood D. C. D. D. hoisting engines.
2 7x10 American D. C. D. D. engines with boilers.

CLAM AND ORANGE-PEEL BUCKETS

2 2-yard Hayward class "E" clam-shell buckets.
1 1½-yard Hayward class "E" clam-shell buckets.
1 1-yard Browning clam-shell bucket.
1 2-yard Page dragline bucket.
1 1-yard Page dragline bucket.

CABLEWAYS

1 Lidgerwood cableway, complete, 750' span, 10x12, 3-drum main engine, carriers, carriage, etc.
1 Shearer & Mayer 1¼-yard 600' span Lidgerwood slack-line cableway and some others.

STEAM ENGINES (CORLISS)

1 16x42 Lane & Bodley Corliss 200 H. P., wheel 12' x 23".
1 20x42 Hamilton Corliss 300 H. P., wheel 14' x 26".
1 24x48 Hamilton Corliss 500 H. P., wheel 16' x 35".

BOILERS (WATER-TUBE)

6 200 H. P. Babcock & Wilcox McClave shaking grates, 150 pounds.
1 250 H. P. Stirling one-battery shaking grates, 150 pounds.

DERRICKS

1 American steel derrick, 115' mast, 112' boom, with bull-wheel.
1 Stiff-leg derrick, 82' boom, 45' mast, 12' bull-wheel.
1 Guy derrick, 70' boom, 60' mast, steel bull-wheel.

MOTORS

1 450 H. P. Westinghouse CCL 25-cycle, 3-phase, 440-volt motor.
2 75 H. P. General Electric Motors, 60-cycle, 3-phase, 220-volt.
1 40 H. P. Westinghouse 60-cycle, 3-phase, 220-volt.

GEORGE C. MARSH & CO.

777 OLD COLONY BUILDING, CHICAGO

Strength
Flexibility
Service

PERFECTION WIRE ROPE

Unless you want the best you won't be interested in Upson-Walton's Crucible Cast Steel, Plow Steel and "PERFECTION" Plow. They are the ropes found in sand and gravel pits, stone quarries and drag line work, and they are giving satisfaction.

PERFECTION

45 years of Wire Rope Experience back of it

THE UPSON-WALTON CO.
CLEVELAND
CHICAGO NEW YORK

WHATEVER YOU NEED IN PERFORATED METALS

There is no branch of the sand, gravel and crushed stone industry for which we cannot furnish the highest quality of perforated metals and screens at rock bottom cost and immediate deliveries.

NORTMANN-DUFFKE FDRY. CO., Milwaukee, Wis.

PROMPT

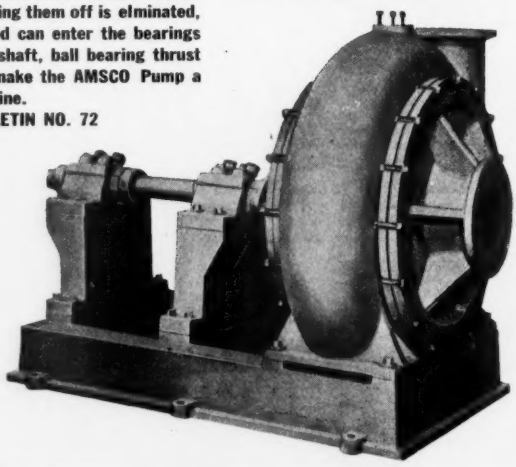
DELIVERY

AMSCO

SAND AND GRAVEL PUMPS

AMSCO Sand and Gravel Pumps built of Manganese Steel wonderfully resist wear and breakage. The suction and hub side plates are interchangeable, and with this feature the pump can be converted to either right or left-handed discharge. These side plates are fastened to the shell by dropping bolts into slotted flanges, thus the common trouble of grinding out stud bolts or breaking them off is elminated, The hub is so designed that no sand can enter the bearings or stuffing box. The extra heavy shaft, ball bearing thrust collar and well balanced runner make the AMSCO Pump a smooth running and efficient machine.

WRITE FOR OUR BULLETIN NO. 72

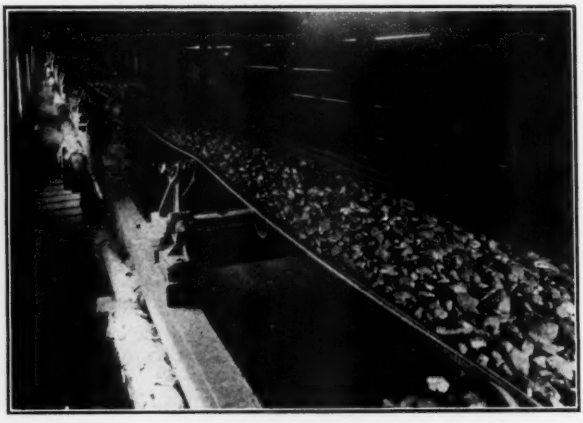


In addition we manufacture Manganese Steel Repair Parts for all types of Pumps, Crushers and Tube Mills; also Gears, Pinions, Detachable Link Chains, Sprockets, Screens, Bars, Wheels, etc.

AMERICAN MANGANESE STEEL CO.

McCormick Building

CHICAGO, ILLINOIS



For Driving and Conveying

Victor-Balata Belt

White Seal Belt

Ampere Canvas Belt

Write for Recommendations, Samples and Prices

Victor-Balata & Textile Belting Co.

CHICAGO
172 N. Franklin St.

FACTORIES
EASTON, PA.

BROOKLYN, N. Y.
465 Kent Ave.

1000 Feet

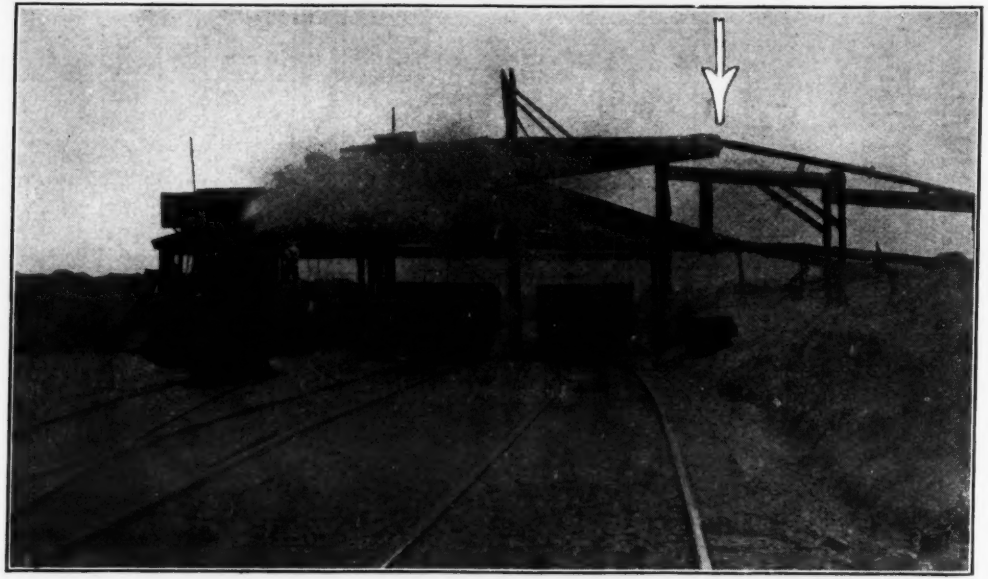
from this screening plant is a—

MORRIS
10-in. Pump

which averages 1000 Tons per day.

One day on a 600-ft. pipe line it produced in ten hours 2040 Tons.

Have You Our Catalog?



Plant of Lincoln Sand & Gravel Company, Lincoln, Ill.
Discharge pipe is 33 feet above surface of water.

MORRIS MACHINE WORKS
BALDWINSVILLE, N. Y.
Branch Offices in Principal Cities

SPECIAL ATTENTION!

LOCOMOTIVE CRANES

FOR ALL PURPOSES

CARS **All Types**—Ballast, Hopper, Gondola, Dump, Flat, Box, etc.

STEAM SHOVELS

ANY SIZE OR TYPE

LOCOMOTIVES

ANY GAUGE, SIZE OR TYPE

What are your requirements? Correspondence solicited.

Please Telegraph, Telephone or Write Us

A. C. TORBERT

Continental-Commercial Bank Bldg., CHICAGO

When Buying Steam Shovel Chain

there are three factors to consider:

QUALITY - STRENGTH - ENDURANCE

TAYLOR MESABA

Steam Shovel Chain has these factors

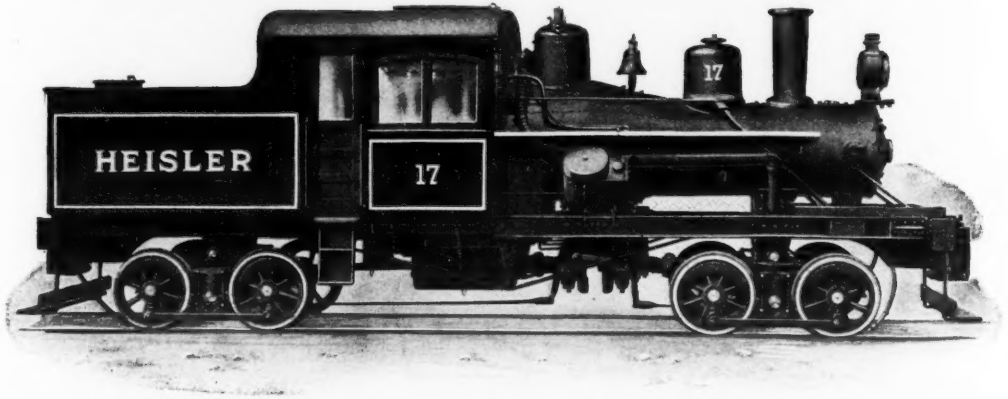
Look for these names on the Padlock Link

Sizes carried in stock—⅜", 1", 1⅛", 1¼", 1⅜", 1½", 1⅝"

S. G. TAYLOR CHAIN COMPANY

138 South Dearborn St. **CHICAGO, ILLINOIS**

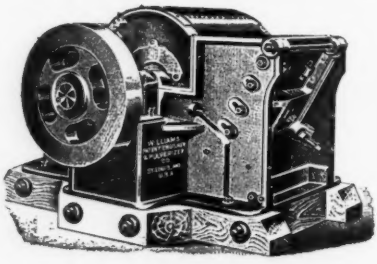
Heisler Geared Locomotives



Do you realize what the Heisler Geared Locomotive can do with its all steel, flexible swivel trucks and center shaft drive; short rigid wheel base, load equally distributed on all wheels; all wheels drivers, each driver having eight impulses of engine to each revolution? This means efficient service on uneven tracks, sharp curves, steep grades; saves in track construction and maintenance. Has a record of always being on the track and ready to start a load quickly. Has many decided advantages over the direct connected or gasoline locomotives for pit and quarry operations. It will pay you to investigate this locomotive for your service. Built in all sizes and gauges. Write today for all particulars.

HEISLER LOCOMOTIVE WORKS : : ERIE, PA.

FROM 14" TO 18" CUBES TO 1½"- 1"- ¾"- ½" IN ONE OPERATION



BY using Williams Jumbo Crushers to take the feed from the very large Gyratory Crushers, the smaller or intermediate crushers, which were formerly necessary, can be eliminated as the Williams Jumbo Crusher will reduce these large cubes ranging in size from 14" to 18" to a product either 1½"-1"-¾" or ½". Capacities from 60 tons per hour to 200 and 300 tons per hour. Complete description of this extraordinary crusher is given in

BULLETIN NO. 85

THE WILLIAMS PAT. CRUSHER & PULVERIZER CO.

Gen'l Sales Dept., Old Colony Bldg.,

CHICAGO

QUARRYMEN!

Bargains for Immediate Shipment

Crushers

1 No. 12 Gates style "K" crusher, elevator and screen, good as new.
1 No. 9 Gates "K," perfect condition.
1 No. 8 Gates "K," first-class.
1 No. 7½ Gates "D," overhauled.
1 No. 6 Gates "D," first-class condition.
1 No. 5 Austin, fine condition.
1 No. 5 Gates "K," right-angle driven, good.
1 No. 4 Austin crusher, first-class.
1 No. 3 McCully, just overhauled.
1 48x60 Allis-Chalmers balanced jaw crusher, good as new.
1 18x36 Farrell Blake type crusher, extra parts, perfect.
1 48" Symons Disc crusher, first-class.
1 24" Symons Disc crusher, first-class.

Elevators

1 No. 12 Gates elevator, 60' centers, fine.
1 No. 9 Austin elevator, 60' centers, good.
2 No. 6 Gates elevators, 45' centers, first-class.
1 No. 5 Austin elevator, 40' centers, first-class.
1 No. 4 Austin elevator, 30' centers, fine.

Screens

1 60" x 20' Gates screen, perfect condition.
1 48" x 16' McCully screen, good as new.
1 40" x 16' Austin screen, good as new.
1 40" x 12' Austin screen, with dust jacket.
1 36" x 10' Austin screen, first-class.

Shovels

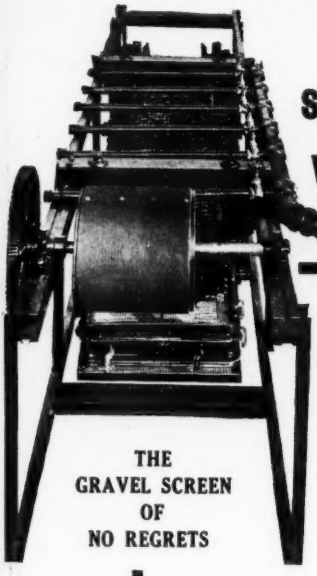
1 Model "250" Marion stripping shovel and drag-line.
1 Model "75" Marion, extra long boom, good as new.
1 70-C Bucyrus, 2½-yard, overhauled.
1 55-ton Bucyrus 2½-yard shovel, good condition.
2 No. 3 Thew revolving shovels, railroad trucks, good shape.

Also snaps in Locomotives, all sizes and gauges of Dump-Cars, Hoists, Boilers, Engines, Rolls, Ballast Cars, etc.

Send us your inquiries and let us save you some money.

MARSH-BOTHE MACHINERY CO.

Old Colony Building, CHICAGO, ILLINOIS



THE
GRAVEL SCREEN
OF
NO REGRETS

SCREENING AND WASHING FOR LESS THAN 1c PER YARD

1c a yard is the figure at which an actual commercial plant turned out 60 yards per hour of perfectly graded and clean sand and gravel of five different sizes. In the plant shown below, the E & S Shaker Screen with washer attachment replaced a $30,000 outfit of a different make, part of which still standing is shown on the left of the photo.

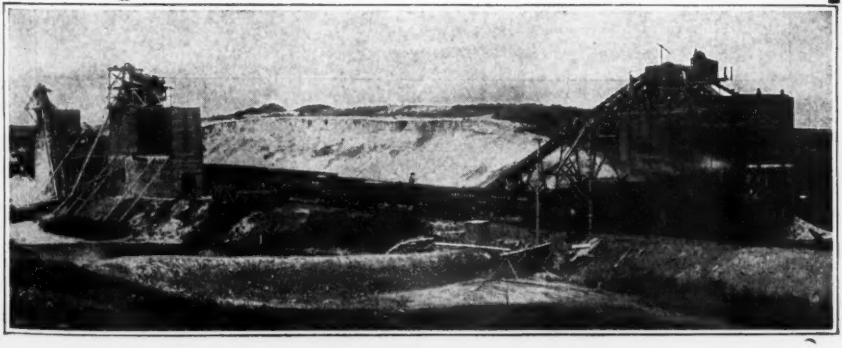
E & S SHAKER SCREEN WITH WASHER ATTACHMENT

is simply the latest of the great efficiency and economy inventions that are bound to develop from time to time in every industry. It has been in practical use for 6 years. It has proved its distinctive merit beyond question. Exactly eccentric motion gives the screens a decided "throw," thus turning out more material at less cost than any other outfit of the same capacity.

There are a score of reasons, every one vital, to you, why you should give the E & S screening outfit your immediate and careful investigation. Start it out by dropping us a line of inquiry today.

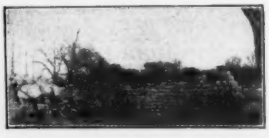
WE
DESIGN
COMPLETE
PLANS

The EXCAVATING & SCREENING MACH. CO.
748 SECURITY BLDG., MINNEAPOLIS, MINN.



This Jeffrey Self-Propelling Wagon and Truck Loader

Reduced Operating Cost 25 to 50%



BELL PHONE 1615. STARK PHONE M-6143.

H. W. DAUCHEY.

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OFFICE AND FACTORY

NORTH INDUSTRY AND BOLIVAR ROADS.

CANTON, OHIO, 3/28/16 191.

The Jeffrey Mfg. Co.,
Columbus, Ohio.

Gentlemen:-

Referring to the A-15 Jeffrey Loader purchased from your Mr. Heller in October, 1915, I am pleased to say that it saved from 25 to 50% in my cost of operation.

Four men repeatedly screened and loaded into dump wagons over 100 yards of material in a day of 10 hours and on one day they got as much as 175 yards

We used the machine directly on the breast of the pit. The machine elevating and screening gravel into one wagon and sand into another wagon, in a satisfactory manner.

Very truly yours,

H. W. Dauchey.

Bulletin No. 177-90 has complete Specifications and Details of our Standard Self-Propelling Loaders. Send for copy of this interesting book.

The Jeffrey Manufacturing Co.

990 North Fourth Street, Columbus, Ohio